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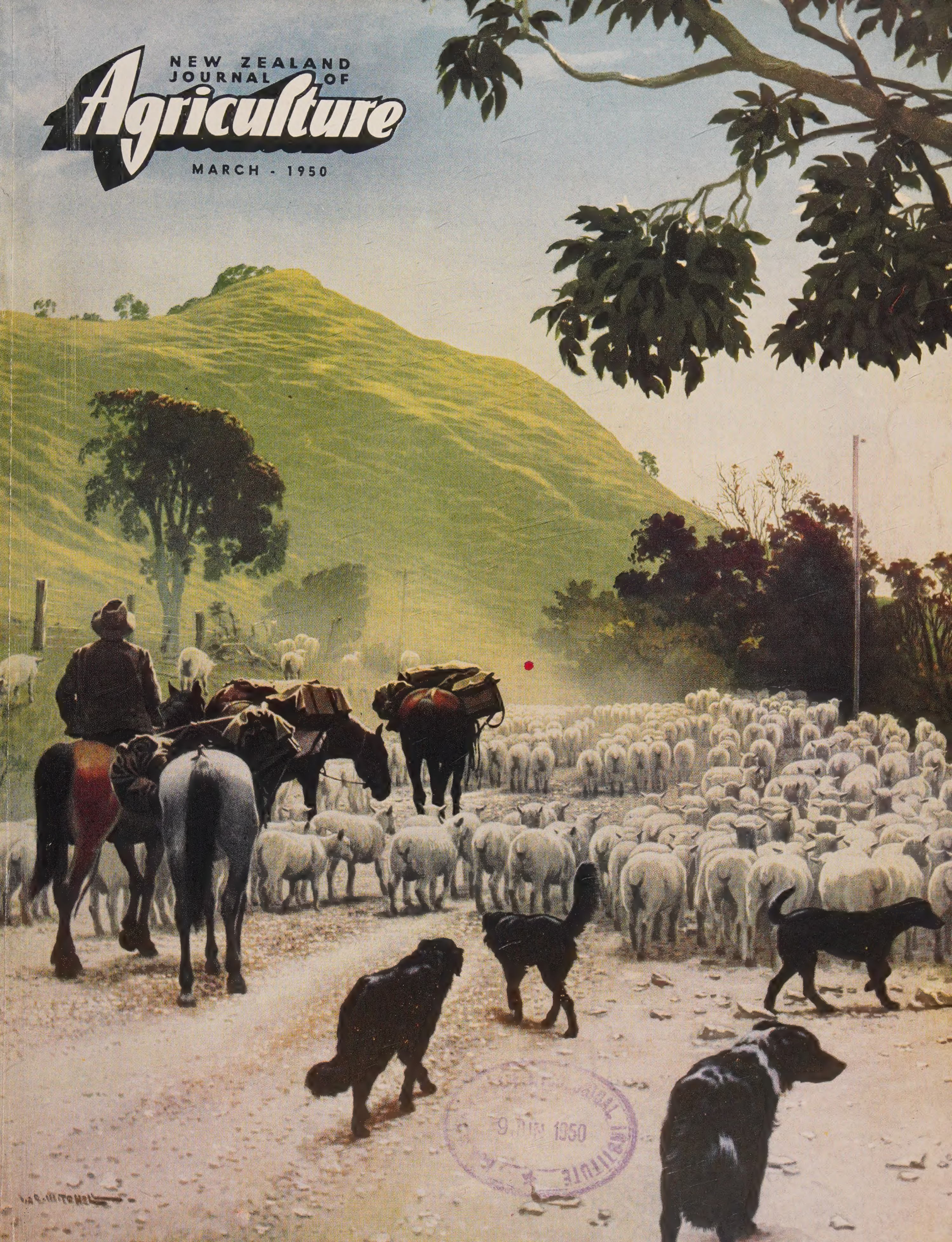
W.A.G. MITCHELL

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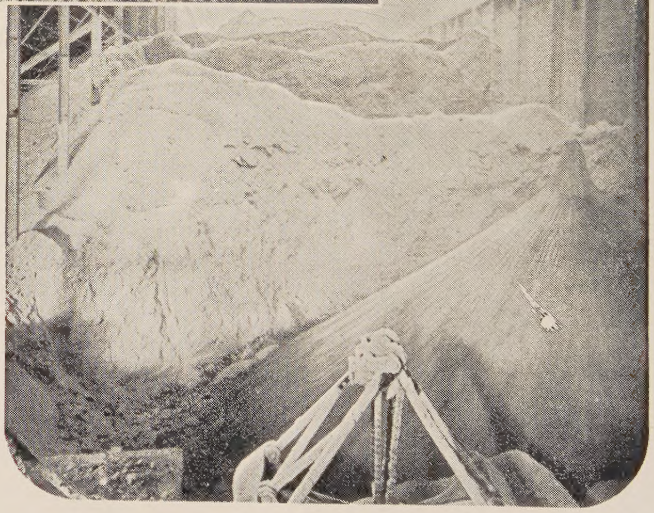
Full Fertiliser Supplies available

Large Rock Phosphate Reserves

BUT FARMERS CAN HELP DELIVERIES BY SPREADING ORDERS THROUGHOUT THE YEAR



Large Stocks of Matured Fertiliser

THE NORTH ISLAND SUPERPHOSPHATE MANUFACTURERS

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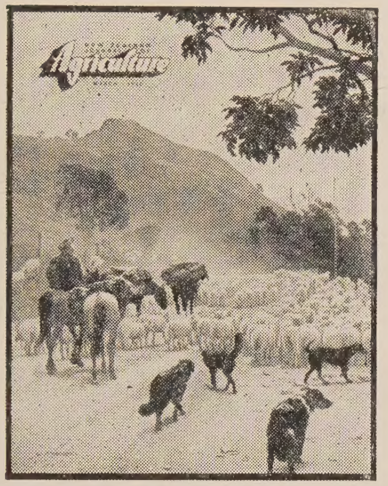
This month's cover



A droving scene on the road between Cape Runaway and Opotiki is the subject of this month's cover, which has been painted by L. C. Mitchell and is based on an Auckland Weekly News photograph. The area on the east coast of the North Island between Opotiki and Gisborne, largely surface-sown hill country, is one of the principal sources of replacement ewes for fat-lamb farmers, and each season thousands of breeding ewes are driven to the railhead at Taneatua. From there they are trucked to disposal centres in the Waikato and the Bay of Plenty.

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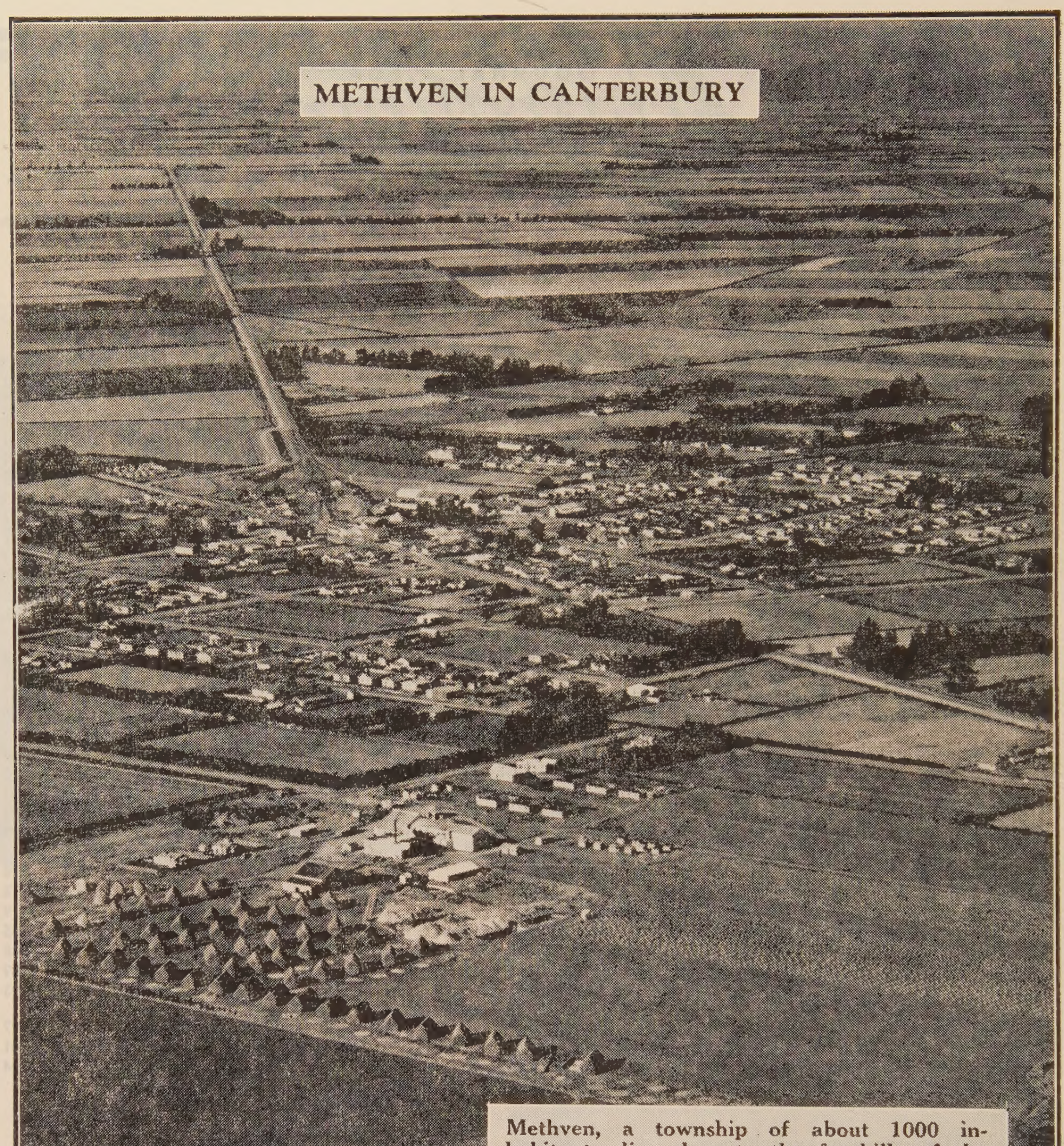


METHVEN IN CANTERBURY

Methven, a township of about 1000 inhabitants, lies close to the foothills of the Southern Alps and is the centre of a rich, arable farming district in the Ashburton County. Wheat is the principal grain crop, the district being noted for its heavy yields of this cereal. Oats, barley, peas, and linseed are also important crops, while small seeds, particularly white clover, are extensively grown. The district is also well known for its production of fat lambs and stud sheep.

[V. C. Browne photo.

PHOSPHATES: A VITAL AID TO AGRICULTURE

"THE production of this vital aid to agriculture [phosphate] entails work calling for much enterprise and careful planning, nor is the element of high adventure wanting," writes Sir Albert Ellis in an article elsewhere in this issue in which he describes the British Phosphate Commission's work in the rehabilitation of Nauru and Ocean Island after the devastation caused by German and Japanese raiders and Japanese occupation forces.

These are very simple words with which to describe an enterprise of such great importance to our agricultural well-being, and when I read Sir Albert's article in manuscript form I felt compelled to add my own tribute on behalf of New Zealand's producers to his restrained description of the magnificent task performed by the Commission and by himself as New Zealand's representative on it.

New Zealand's Agricultural Economy

New Zealand's agricultural economy is based primarily on production from her grasslands and the importance of correct use of phosphates in the stimulation and maintenance of pasture growth has long been realised. Before the war New Zealand farmers had come to rely on superphosphate as the main phosphatic fertiliser for topdressing grassland and to make use of its rapidity of action in stimulating the autumn and early winter growth of grass. The winter carrying capacity of our dairy and fat-lamb farms was thus greatly increased. Before the Second World War the amount of phosphatic manures applied annually to New Zealand pastures had increased from about 270,000 tons in 1926-27 to about 650,000 tons in 1939-40. In the same period the total area of our grassland topdressed increased from a little over 2½ million acres to over 4 million acres. A continuous supply of phosphatic rock from Nauru and Ocean Island had become essential and was in fact basic to our agricultural well-being. The demands of New Zealand were well met by the British Phosphate Commission, whose installations at Nauru and Ocean Island had reached a production of 1¼ million tons by 1939.

Effect of Cessation of Supply

Sir Albert quotes: "Phosphate is one of those things whose value is not realised until the supply ceases." When destruction of the installations at Nauru and Ocean Island during the war and the occupation of the islands by enemy forces cut off completely our phosphate supplies, the effect on production from our grasslands threatened to be grave. Only the promptest action to procure alternative sources of supply and the imposition of an impartial rationing system for fertilisers avoided the gravest immediate effect on our food production.

Efforts of Commission

That supplies, though inadequate, were able to be continued during this period of war emergency was due largely to the efforts of the Commission, and again a tribute is due to Sir Albert's work as New Zealand representative on it. The Commission was given a free hand in obtaining phosphate supplies wherever possible, and alternative sources of supply proved the life-blood of our production effort.

Great credit is claimed, and I think rightly, for New Zealand's food production effort during the war and for her maintenance of the flow of food to Britain at a continued high level thereafter. Sir Albert's story, however, shows that one of the essentials to that continued production was not obtained without hardship, perseverance, great planning, and high adventure.

To achieve by the end of 1949 production figures from Nauru and Ocean Island equal to the best results in pre-war years must have seemed an impossibility to all those other than the indomitable spirits who forecast such a result in 1946. Sir Albert's description of the planning and preparations for the rehabilitation of Nauru and Ocean Island while the war was still being fought must stir the imagination and invoke the gratitude of all of us who have the welfare of our farming at heart.

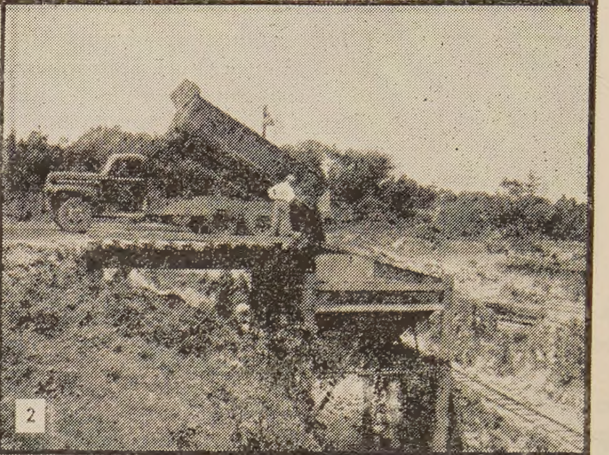
Heartening Assurance to all Farmers

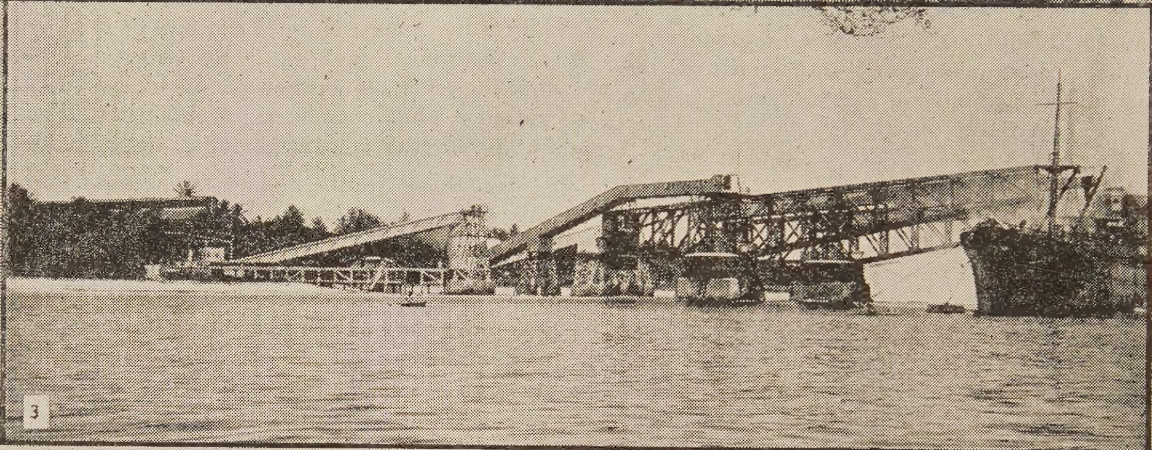
The assurance of adequate supplies of phosphatic fertilisers implicit in Sir Albert's account of the successful restitution and even improvement of quarrying and loading facilities at the two islands must be heartening to all farmers. While men of the calibre of Sir Albert continue to devote themselves to the service of our great primary industry its welfare is assured.

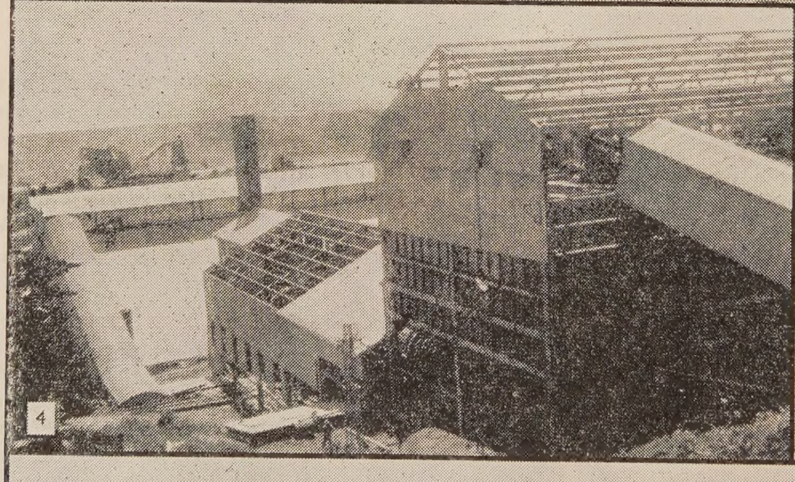
The Government is desirous that supplies of phosphatic fertilisers shall be distributed in the most efficient manner possible and at rates that make their application on all types of farm land requiring them an economic possibility to the farmer. Every encouragement and assistance will be afforded in the construction of additional fertiliser manufacturing works where required and investigation of modern methods of transporting and spreading will be pressed forward. With such a wonderful example before us of initiative and great endeavour in the restitution of raw phosphate supplies, we cannot be found wanting in facilitating in every way possible the use of the manufactured fertilisers to the very best advantage.

K. J. HOLYOAKE, Minister of Agriculture.

REHABILITATION OF NAURU AND OCEAN ISLAND







1. Rebuilt Chinese quarters at Nauru. Japanese gun in foreground. 2. Phosphate quarrying and transport operations at Nauru. Railway trucks load at hopper and thence run to main phosphate unit. 3. The Oakbank loading under the cantilever before the war. 4. Repairs to main phosphate unit at Nauru. In foreground conveyer and crushing building, then artificial driers and conveyer to storage bin of 60,000 tons capacity. In the distance is the cantilever under repair. 5. Quarrying phosphate by power shovel and motor truck in selected country at Nauru. To the left is a typical coral pinnacle. All the vegetation at the back of the illustration is growing in phosphate.

REHABILITATION OF NAURU AND OCEAN ISLAND

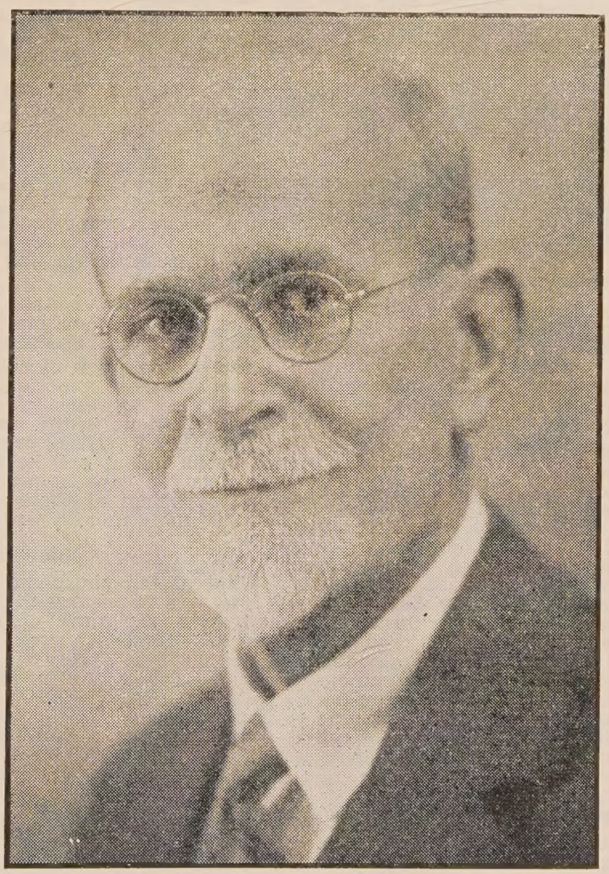
By SIR ALBERT ELLIS, New Zealand Representative on the British Phosphate Commission.

SOMEONE has said about phosphate that it is one of those things whose value is not realised until the supply ceases. Most people simply take it for granted. Nevertheless the production of this vital aid to agriculture entails work calling for much enterprise and careful planning, nor is the element of high adventure wanting. Indeed, there is too much of it at times!

SINCE the acquisition of the Nauru and Ocean Island phosphate industry in 1920, when the organisation known as the British Phosphate Commissioners was set up, the requirements of high-grade phosphate for New Zealand were met almost entirely from these two islands. With ever-increasing agricultural and pastoral production in New Zealand and Australia the demand for phosphate rose proportionately, as it must continue to do in the years that lie ahead, but by developing the resources of Nauru and Ocean Island all requirements were met, and by 1939 the annual output had risen to 1¼ million tons.

Enormous Damage by Enemy Raiders

In the Second World War Hitler became aware of the vital importance of these supplies and in the latter part of 1940 two German raiders arrived in the Pacific. Part of their programme was to put the phosphate industry out of action. Five of the Commission's vessels were sunk, Nauru was bombarded for two hours, and enormous damage was done, mainly to the shipping plant. The cantilever came in for most attention, but though it was hit repeatedly by shell fire and was doubtless considered wrecked by the raider commander, the main structure still stood upright. Repairs were put in hand immediately, but by the time one of the arms was ready to resume loading the Japanese came into the war and we knew the position was hopeless, for they too were fully aware of the value of the phosphate deposits. Their bombers attacked both islands the day after the Pearl Harbour raid and repeatedly afterwards, doing much damage. Defence was impossible and evacuation became necessary. Shortly after, the enemy occupied the islands in strong force, remaining there for 3 years, during which time the places were fortified very thoroughly. An air base was constructed at Nauru, long naval guns were installed, and round the coast was a series of tank traps, machine-gun posts, and underground shelters. Both islands seemed practically impregnable.



[*Schmidt Studios photo.*

Sir Albert Ellis, New Zealand representative on the British Phosphate Commission.

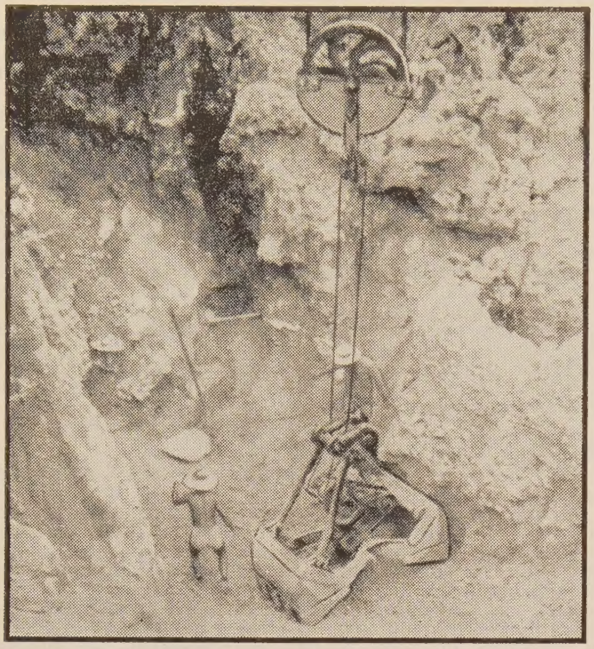
Meanwhile strong American forces had become established at Tarawa after the great battle there. Fleets of bombers were soon over Nauru, the air base was put out of action, and further damage was done not only to the enemy equipment but also to our phosphate plant. This was revealed by aerial reconnaissance photographs. On one occasion a squadron of capital ships made an early morning call off Nauru and opened fire with 16in. guns, adding to the devastation. They left as a memento an unexploded 16in. shell near the main road, and it is still one of "the sights." Fortunately no landing was attempted, for the loss of life would have been very heavy.

With the cutting off of phosphate supplies from the two central Pacific islands the position soon became serious in New Zealand and Australia. In close touch with the Department of Agriculture in each country, the British Phosphate Commission was given a free hand in obtaining phosphate supplies wherever possible. Makatea, a French island in the eastern Pacific, was of great value in this connection. A rigid rationing system was set up and naturally farming interests suffered considerably through shortage of fertilisers. The release of Nauru and Ocean Island was therefore eagerly awaited.

Post-war Preparations for Restoration

After the war ended in September, 1945, an Australian Expeditionary Force went to both islands and the surrender of the Japanese forces there was accepted. As a representative of the New Zealand Government, the writer had the privilege of being present on these important occasions. Simultaneously a party of the British Phosphate Commission's managers and engineers landed to report to headquarters on the damage and make preparations for the restoration of the industry. A tragic story of war crimes and atrocities on both islands was revealed; the natives and a limited number of Europeans, all of whom were dead when the surrender took place, suffered dreadfully at the hands of the enemy. Considering their size it is doubtful if any islands in the Pacific had such a bad time as these two small isolated places. Subsequent investigations resulted in numerous offenders being arrested, and there is reason for thinking that the claims of justice were fully met.

With the removal of the Japanese the time for the rehabilitation of Nauru and Ocean Island had come. Inspection showed that Nauru was wrecked; "it was a shambles," to use the term of the expeditionary officers; our settlement was a tragic scene of desolation and war damage and would require rebuilding entirely. The same pertained to the administration and mission stations. This destruction was not unexpected and preparations had been made for the work of restoration, as far as the phosphate industry was concerned, by accumulating at Melbourne an enormous quantity of material such as prefabricated houses and workshops, diesel engines, machinery, motor trucks, powered lighters, mooring material, provisions, etc. The Commission's sole remaining vessel after the attentions of the German raiders, the Trienza, was loaded up and with an enthusiastic crowd of our island staff, mostly old hands, set out for Nauru and Ocean Island. Naturally there



Quarrying phosphate by grab and cableway at Nauru. The rock at each side and the back of the grab is limestone, the phosphate having been removed.

was considerable hardship at first, for the Japanese had left the islands in a disgusting and insanitary state, particularly at Nauru. Simultaneously with these activities a large force of Gilbertese and Ellice Island natives was recruited, many of them being old hands and glad to re-enter the employ. Not long afterwards a Chinese labour force from Hong Kong arrived, many of them being mechanics who, under the supervision of our experienced staff, proved most useful. "Full speed ahead!" was the order of the day.

More Convenient and Suitable Layout

Plans had been prepared beforehand for the reconstruction work and it was found possible to make the whole layout of the settlement, the labourers' quarters, hospitals, workshops, stores, etc., on much more convenient and suitable lines than was the case previously. Buildings went up in rapid succession and it was not long before living conditions on both islands had greatly improved.

Meanwhile preparations for the resumption of phosphate shipping operations were pushed ahead. With the cantilever so badly damaged and the Ocean Island jetties destroyed, it was necessary to make improvised arrangements, using the old jetty at Nauru and the boat harbour at Ocean Island for shipping by means of lighters. Long conveyers were installed connecting the phosphate bins with these points of shipment. The elaborate system of deep-sea moorings at both islands had been completely destroyed. To re-lay these a vessel with special gear in the form of a massive mooring winch and other appliances was required. The German raiders had sunk both of the Commission's vessels which were thus fitted, but we were fortunately able to get one built during the war and she did the work of re-laying in good style. It was thus possible to resume phosphate shipping 7 months after the reoccupation of the islands, though necessarily at a much slower rate than in pre-war years.

More Mechanisation in Re-establishment

Early attention had been given to the phosphate quarrying, transport, artificial drying, and storage plant, all of which was badly damaged. The tram lines had all been ripped up by the enemy, the sleepers being used for firewood and the rails cut into short lengths for building their machine-gun posts, pill boxes, dug-outs, etc. Many rails were placed upright in lines on the reef as barriers to landing craft. Worst of all, our elaborate cableway towers built of latticed steel were toppled over and cut into suitable lengths for constructing underground shelters and so forth. Costly conveyer belting was cut into short lengths and used as floor covering for the enemy's defences. Our engineers devised ways of using much of the damaged steel work, for such material was scarce and difficult to purchase. A great deal of electric welding of cableway towers, tram rails, etc., was done, necessitating much extra work. The position led to the use of mechanised plant for quarrying and transport of phosphate, much more than in pre-war days, and this at least has proved an advantage. Mechanical shovel loaders of various types, also grabs, were obtained and are proving very serviceable, though they can be used only in selected phosphate country where the limestone pinnacles are not too numerous. Elsewhere the hand labour methods of pre-war days are necessary.

The artificial drying plant had suffered very badly, but fortunately the enormous steel dryer cylinders were intact and are now in use; the electric dust-precipitating plant was damaged beyond repair. For some months it was necessary to dispense with drying the phosphate and to ship it wet.

In the powerhouse several of the damaged diesel engines have been repaired and the new machines installed, placing this vital portion of the plant in a strong position.

Great improvements have been made in the workshops and stores buildings. Whereas in pre-war days they were more or less scattered about the settlement, they are now contained in two large pre-fabricated steel framework buildings suitably placed and most convenient for their various purposes, thereby effecting a great saving of labour.

Loading of Vessels Speeded Up

Throughout the tragic war experiences the Nauru cantilever seems to have had a charmed life, for, though greatly damaged, the vital parts practically escaped, and so the main structure remained standing. Repairing it has been a long and costly job, but here again our engineers found that they could "go one better." Whereas the original specifications called for a shipping rate of 550 tons per hour, it was found that the structure permitted of speeding up the rubber belt conveyers and increasing their size. The main belt is now 4ft. wide and phosphate is delivered direct into the holds of vessels at the rate of 1600 tons per hour, nearly thrice the original rate. This improvement is of the greatest importance, and quite frequently a large 10,000 ton vessel arrives at Nauru in the morning, hauls under the cantilever, and is away in the evening fully loaded.

At Ocean Island the damage was nothing like so serious, but the plant and general arrangements were not on such an extensive scale in pre-war years as on Nauru.

And so the work of rehabilitation has gone on, all departments under experienced heads pulling their weight and working together toward the one end. There is still much to be done in the way of construction work and improvements on existing procedure, but when finished Nauru and Ocean Island will be more efficient and labour-saving than was the case in pre-war days. Labour has been a serious problem at times, as elsewhere, but all has gone well for many months and we hope for the best.

Pre-war Output Achieved

What of the phosphate shipments? Our forecast early in 1946 was to restore the full output capacity in about 4 years from the time of recommencement of shipments. This has been achieved, for during 1949 the shipment figures were:—

	Nauru Tons	Ocean Island Tons	Totals Tons
January-June ..	290,250	127,750	418,000
July-December ..	499,150	133,150	632,300
Totals	789,400	260,900	1,050,300

It will be seen that during the latter 6 months the figures were up to our best results in pre-war years.

In conclusion may I express on behalf of my colleagues and myself our warm appreciation of the good efforts put forth by the general manager, our staff, the labour, and all concerned in the great work which is but briefly described in the foregoing.

The Pasteurisation of Town-milk Supplies

THE extent to which the process of pasteurisation is misunderstood in New Zealand is quite surprising. No doubt human reaction to something new is partly to blame and some excuse can be made on that score, but objection based on inadequate technical knowledge cannot be justified. In this article T. P. J. Twomey, Superintendent of Market Milk Production, Department of Agriculture, Wellington, endeavours to remedy such lack of knowledge in a manner which will enable all but the most bigoted to realise that the pasteurisation of milk is but another advance in the never-ending battle against preventable disease.

[*News-photo Service photo.*

The bottle-dispatch dock of New Zealand's newest milk-treatment station, that at Hastings.

IN August, 1857, the French scientist Louis Pasteur announced to the Scientific Society of Lille his discovery that the souring of milk was caused by minute single-celled organisms acting on and fermenting the natural sugar in milk. Several years later he completed his investigations into the control of undesirable fermentation in wine and found that heating the wine to 55 degrees Centigrade (131 degrees F.) ensured the destruction of the organisms causing the trouble. These two related discoveries led the way to the introduction of pasteurisation to the milk industry of the world and thus to the saving of untold human lives from death or crippling by milk-borne disease germs.

Bacteria in Milk

To understand why milk goes sour and why disease can be caused by milk it is necessary to realise the functions of germs in nature. Germs or bacteria are minute single-celled forms of living matter and are dispersed in tremendous numbers throughout practically all forms of organic material. Bacteria are far too small to be seen by the naked eye, but under a suitable microscope they are shown to be either rods or spheres.

Bacteria, being composed of living tissue, require food to sustain life. Food is absorbed through their bodies and the waste products are eliminated in the same manner. Therefore when bacteria are present in sufficiently large numbers they can effect a measurable chemical change in the composition of the food stuff acting as host to them. Milk by its nature is a highly nutritious human food and, unfortunately for farmers and the dairy industry, is equally as nutritious to quite a large variety of bacteria. Milk contains fat, protein, and milk sugar, and each of these constituents is readily capable of being acted on by different bacteria, with the resultant formation of unpleasent waste products of the bacterial cycles of life.

The most common example of bacterial action in milk is the fermentation of the milk sugar (lactose) to lactic acid. It is this lactic acid which gives the acid flavour to sour milk, and when it has developed to a sufficient degree it also causes curdling of the milk, which then has the typical sour-milk appearance.

Pathogenic Bacteria

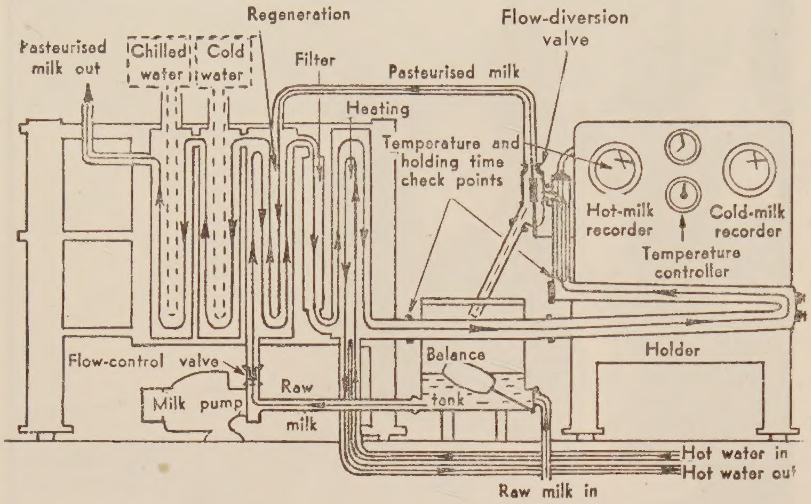
Germs which are capable of causing disease are known as pathogenic bacteria. A number of them thrive in milk, and if they gain access to it, they can constitute a deadly menace to health.

These pathogenic bacteria can gain access to milk from two sources—from diseases of animal origin and from diseases of human origin. In general the germs of animal diseases are transmitted to the milk by the cow before the milk leaves the udder, and the germs of diseases of human origin find their way into the milk after the milk has been produced by the cow.

Of the diseases of animal origin the ones most commonly associated with milk are bovine tuberculosis and contagious abortion. The germs of bovine tuberculosis are capable of giving rise to tuberculosis in human beings, this form of the disease usually being of a kind other than that associated with the lungs, and affecting instead such parts of the body as the glands and joints. The germs of contagious abortion in cattle can cause undulant fever in human beings. Undulant fever, so called from the characteristic way in which the feverishness associated with the disease increases and decreases—or undulates—in intensity, is a debilitating illness of long duration. Though not normally fatal, undulant fever seriously reduces the resistance of the human body to other and more serious diseases.

Of the diseases of human origin the ones most commonly disseminated by milk are typhoid or enteric fever; septic sore throat and scarlet fever; gastro-enteritis and food poisoning; and diphtheria. The germs of these diseases find their way into milk by

THE WORKING OF A PLATE-TYPE PASTEURISER



The milk is heated to 110 degrees F., filtered under pressure, heated to 162 degrees, held at that temperature for 15 seconds, and then cooled to 40 degrees, all automatically and untouched by hand. The raw milk flows from the storage or receiving tank to the balance tank, in which a constant level of milk is maintained by a float valve. From this tank the milk is pumped at a rate regulated by the flow controller to the regenerative section of the plates. Here it is pre-heated by the milk passing back for cooling. The milk passes to the filter without leaving the machine and then to the heating section, where it is raised to just above the legal minimum by the circulation of water only 2 to 3 degrees F. above the temperature of the milk. The heated milk leaving the plates flows to the tubular holding system in an air-insulated chamber in the base of the control panel. After being held it passes the flow-diversion valve and is led back to the plates for cooling by regeneration, cold water, and finally chilled water or brine. The temperature of the finished milk is recorded before it passes to the bottling plant. Any sub-temperature milk is diverted to the balance tank.

direct contamination of the milk with the germs—for example, through the germs of typhoid fever in an infected water supply, or the germs of scarlet fever transmitted to the cow's udder by an infected milker and then retransmitted by the cow to the milk. In general, the germs of all the diseases of human origin listed are themselves the toxic agents—that is, illness follows the swallowing of infected milk because of the action of the germs on the human body itself. However, in some cases of food poisoning illness is caused by the toxin or poison already produced by the germs in the milk; fortunately, such cases are rare.

Importance of Cooling

Most bacteria find milk a food entirely to their liking and as a result thrive particularly well once they get into it. They prefer conditions of moisture and gentle warmth, and under such conditions they can reproduce themselves every half-hour or so. Bacteria reproduce by splitting into two, each part becoming almost at once a fully developed germ capable in turn of reproducing itself in the same manner. Thus one germ, reproducing itself twofold, fourfold, eightfold, and so on every half-hour, could produce 100,000 descendants in 12 hours.

Fortunately, most germs dislike cold and, if the temperature of the milk is kept sufficiently low, their reproductive abilities are reduced. However, once the temperature of the milk rises again they rapidly regain their previous vitality.

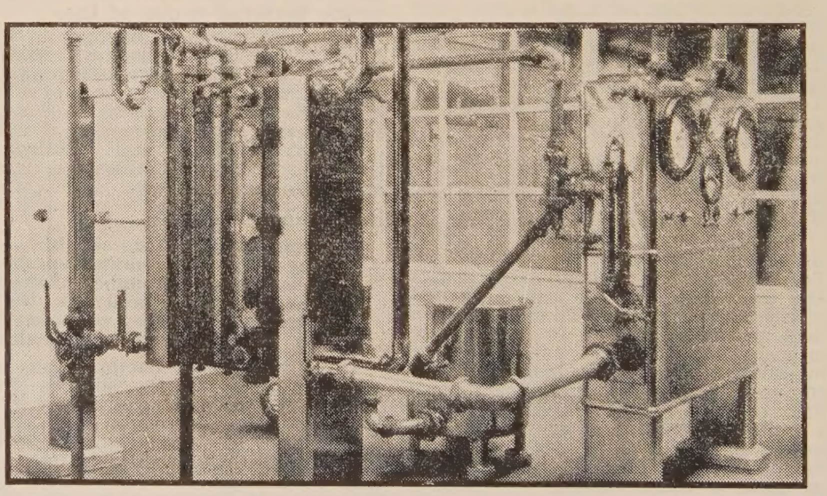
Proper cooling of milk and its retention at a low temperature after being cooled are therefore of vital importance, but cold alone will not kill germs; it only restricts their reproductive abilities.

Principles of Pasteurisation

Once bacteria find their way into milk they can be destroyed only by the use of chemical disinfectants or by the application of heat. The use of disinfectants obviously is unsuitable in the case of milk, and therefore the application of heat is the most widely used method of making milk safe by destroying any pathogenic bacteria it may contain. The process of applying heat to the milk for this purpose is known as pasteurisation.

Housewives have long known that the keeping quality of milk can be improved by boiling it. After Pasteur had shown the connection between cause and effect in the boiling of milk it was to be expected that dairy technicians would take a hand in trying to assist housewives in this direction, and as a result the first heat-treatment machine was patented in 1881.

Once this scientific approach to the destruction of bacteria in milk by heat was initiated it was soon found that the boiling process was unnecessarily drastic and that satisfactory destruction of the bacteria in milk could be



[*Bryant Brothers photo.*

A plate-type pasteuriser, the working of which is described in the diagram on this page.

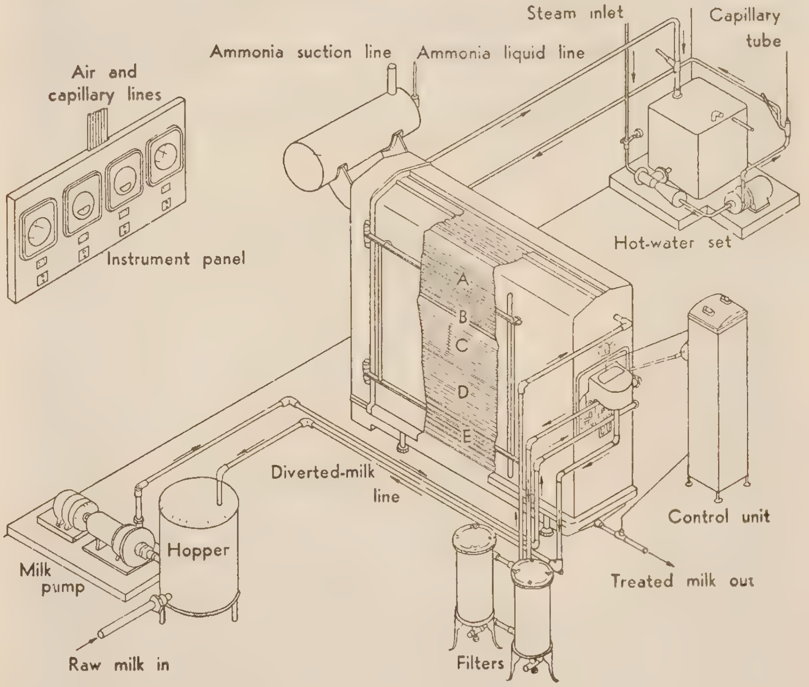
effected at temperatures well below boiling point, providing such temperatures were controlled strictly. This approach to the problem has coloured all subsequent developments, the principal aim of each treatment machine being to avoid changes effected in milk by boiling and to destroy the bacteria in the milk without causing a physical change in the milk itself.

Setting of Standards

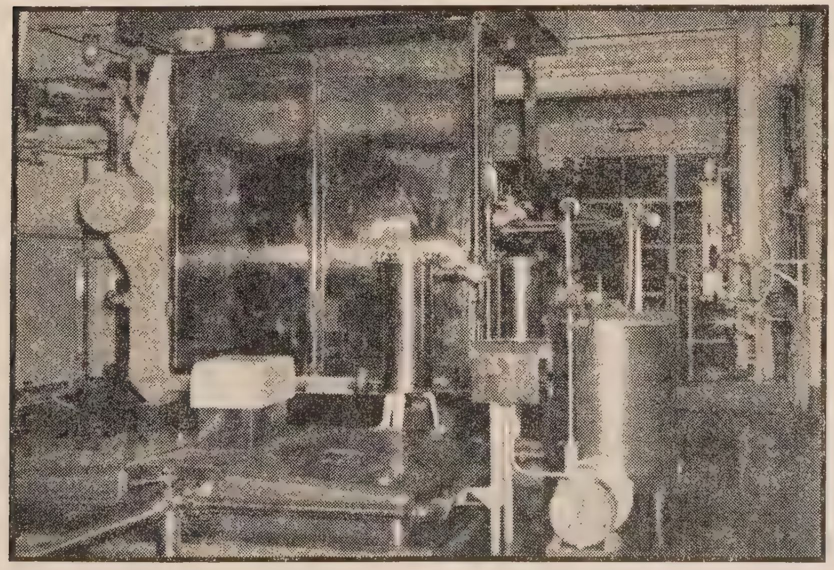
In the early stages of development machines were designed to heat milk continuously to a fairly high temperature, perhaps 180 or 190 degrees F., and the milk was exposed to this temperature only momentarily. This method of pasteurisation was known as the flash method because the milk was merely flashed to the high temperature, no attempt being made to hold it at this temperature for any length of time. It was quickly realised that equally good bacterial destruction could be effected at temperatures much below 190 degrees, particularly if the milk was held for some time at this lower temperature.

Some standard of bacterial destruction had to be decided on before it could be said that milk had been properly treated or pasteurised. Bacteriologists were aware that of all the pathogenic bacteria which might be found in milk the most resistant to destruction by heat was the tubercle bacillus, the causative germ of bovine tuberculosis in human beings. At temperatures sufficient to kill this germ all other disease germs were destroyed easily, and therefore it was decided that the temperature and holding time adequate to destroy this germ in milk would represent the minimum temperature and holding time which would constitute proper pasteurisation. This tubercle bacillus was found to be unable to withstand a temperature of 140 degrees F. sustained for 20 minutes or a temperature of 158 degrees sustained for 12 seconds.

THE WORKING OF AN H.T.S.T. GRAVITY-TYPE PASTEURISER



Raw milk from the receiving tank is pumped into the regenerative section (C). After being pre-heated it passes through the twin filters and up to the main heating section (A). Flowing down over this section in a film, the milk is raised to pasteurising temperature and enters the holding trough (B), where it remains for a minimum of 15 seconds. After being held the milk flows on, still by gravity, to the distributing trough above the regenerative section, over the outside of which it flows, giving up much of its heat to raw milk inside the tubes. Still as a film, the milk then passes over the water cooling section (D) and the refrigerating section (E) to the tank, from which it is piped away to the bottle-filling machines.



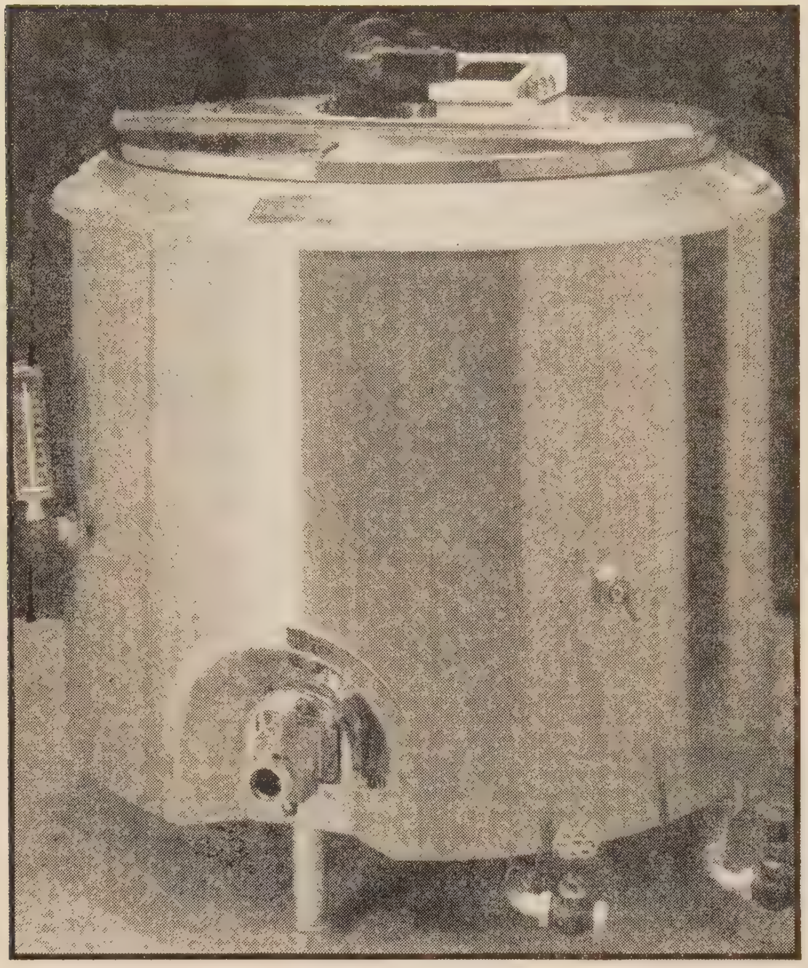
[Jack Welsh and Sons photo.

A gravity-type pasteuriser, the working of which is described in the diagram on this page.

To allow for adequate safety the temperature and holding time set for satisfactory pasteurisation by the holding or low-temperature method were 145 degrees F. for 30 minutes—that is, 5 degrees above the minimum temperature and 10 minutes longer than the minimum holding time. The temperature and time set as a minimum requirement for the H.T.S.T. (high temperature-short time) method of pasteurisation were 162 degrees F. for 15 seconds—4 degrees above the minimum temperature and 3 seconds more than the minimum holding time.

A lack of specific holding time in the flash process of pasteurisation constituted a weakness in this method, and therefore the next development was the application of a holding time with a reduction in the temperature. The method evolved was termed the holder or batch process and in this method the temperature-time relationship was 145 degrees F. for 30 minutes. The designs of these machines continued to improve through the years, and now small non-continuous batch pasteurisers are as popular as ever in small dairies.

THE PASTEURISATION OF TOWN MILK



A small, stainless-steel, batch-type pasteuriser.

However, a system of pasteurisation which involved a holding time of half an hour was certain to cause delays in the processing depots, and during the war years a system of pasteurisation known as the high temperature-short time or H.T.S.T. method was introduced. With a record of 8 years' satisfactory service, the process has now come to be adopted as standard in many countries. A temperature of 158 degrees F. for 12 seconds was found to be satisfactory for the destruction of the tubercle bacillus in milk; the temperature and time for the H.T.S.T. process were set at 162 degrees F. for 15 seconds, though the temperature has recently been reduced in England to 161 degrees.

Modern H.T.S.T. pasteurisers are streamlined, hygienic, efficient, and foolproof, and the only metal with which the milk comes in contact in the process of being pasteurised is stainless steel. Nineteen of New Zealand's milk-treatment stations operate these newest H.T.S.T. pasteurisers, 14 units having been installed within the past 3 years

Efficiency of Pasteurisation

Pasteurisation or heat treatment when applied to milk results in two benefits—the destruction of disease-bearing organisms, which means that the milk is safe to drink from a hygienic point of view, and the destruction of milk-souring organisms, which means that the milk has enhanced keeping quality.

In early pasteurisers the high temperatures used tended to give a distinctive flavour to the milk. This weakness was quickly recognised by both public health officials and dairy engineers, and no effort has been spared to produce a pasteurised milk indistinguishable by taste as such and to design such mechanical safeguards as would make it impossible to pasteurise milk below the obligatory legal temperatures and holding times. These safeguards are the most notable feature about the design of modern pasteurisers—they are as foolproof as human ingenuity can make them, 70 years of mechanical pasteurisation experience having gone into their design.

The heart of the H.T.S.T. pasteuriser is the flow-diversion valve, an ingenious piece of equipment which controls the flow of the pasteurised milk to storage tanks or bottle fillers so accurately that no milk which has failed to reach 162 degrees F. or which has been held for less than 15 seconds is permitted to flow forward; if such milk reaches the flow-diversion valve, the valve closes and diverts the under-pasteurised milk back through the machine and continues to do so until the milk has been held satisfactorily at 162 degrees F. for the full 15 seconds. If the electricity supply actuating the valve fails, the valve closes against the milk and continues to divert all the milk until the current is reconnected. The valve cannot be tampered with while the machine is operating and the machine will not operate if the valve has been set incorrectly. On modern machines the actions of the flow-diversion valve are recorded on a special recording chart so that there is a visual as well as an automatic mechanical control over the operation of the entire pasteurising process.

Opposition to Pasteurisation

Ever since pasteurisation was introduced 70 years ago the process has had its detractors and opponents. Some people base their antagonism on the admitted weaknesses of the early pasteurising plants, others on the fear that pasteurisation effects undesirable changes in milk, and still others on the doubtful logic of the argument that "what was good enough for my father is good enough for me".

In some countries, including Great Britain, America, and those of Western Europe, pasteurisation has long been accepted as the only satisfactory solution to the problem of milk-borne disease. In these countries the process has come to be an accepted factor in the maintenance of public health, and indeed is compulsory in most towns and cities.

The evidence adduced over the years in favour of pasteurisation has been so great that little alternative has been left but to decide in its favour. The bulk of this evidence has been capably summarised by Professor G. S. Wilson, of England, in his book "The Pasteurisation of Milk," which should be read by every thinking person who has to decide between pasteurised milk and raw milk on a child's behalf. Professor Wilson set about his task of writing this book in a completely objective frame of mind; he weighed up all the available evidence both for and against pasteurised milk, and his findings, in contrast to those of the more illogical detractors of pasteurisation, have the advantage of being both objective and fully documented. Following is an extract from the preface he wrote to his book in 1942:—

> Whatever the verdict of the economist or the politician may be on the advisability of introducing compulsory pasteurisation, no one, it is hoped, who approaches this question with an open mind will have any doubt after reading this book that the need for pasteurisation is fully justified by all the available scientific evidence, and is supported by such a wealth of authoritative medical opinion as has seldom before been united in favour of any measure designed to protect and foster the public health of the nation.

The extent to which opposition to pasteurisation has died down in England can best be measured by the degree to which opposition to pasteurisation is still vociferous in New Zealand. Pasteurisation is fairly new in some areas of this country, and it is intriguing to the writer to hear the same arguments being brought forth in New Zealand now as were presented in Great Britain 15 years ago. No new arguments are offered by the opponents of pasteurisation, and the answers to the present arguments therefore follow well-tried lines.

Here are some of the arguments most popularly used and comments on the fallacies inherent in them:

"As pasteurisation is only a cure, why not use prevention instead?"

Pasteurisation is not strictly a cure but rather a safeguard. Disease germs can find their way into milk not only in the cow's body but from external sources of contamination, which may be anywhere between the cow and the consumer. Diseases of animal origin (tuberculosis and contagious abortion) can be prevented, but foolproof safeguards against external contamination of the milk after it leaves the cow still remain a pipe dream.

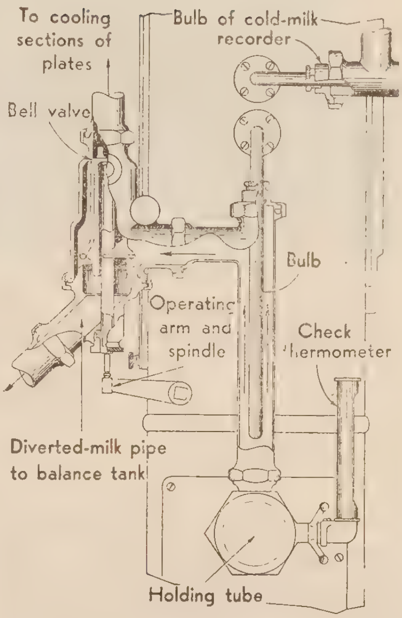
Cows secreting the germs of tuberculosis can be detected by the tuberculin test and cows harbouring the germs of contagious abortion can be detected by the agglutination test. However, the production of milk from disease-free herds does not by itself guarantee safety to the milk consumer. Milk is so readily susceptible to contamination with disease germs other than those of bovine tuberculosis and undulant fever that it is useless to think precautionary measures will always be so well carried out that such contamination will never take place. Anyone with experience in the laboratories of milk-treatment stations knows from sad experience that perfection, though attained by some, is never attained consistently by all.

"Does not the continual drinking of raw milk build up resistance to and provide immunity against tuberculosis?"

There is little medical evidence that such is the case, and even if it were, the consumption of typhoid-infected milk could hardly be justified on similar grounds. Tuberculosis is only one of the diseases transmitted by infected raw milk. Milk for pasteurisation should be from cows free from tuberculosis and it should then be pasteurised for safety against undulant fever, typhoid fever, septic sore throat, and the other milk-borne diseases already referred to. Haphazard vaccination of the type suggested is of doubtful efficacy and is fraught with potential danger.

"If milk is cooled by refrigeration it is safe."

Chilling or cooling milk does not destroy disease germs. It reduces their reproductive capacity as long as the milk is held at a low temperature, but immediately the temperature rises—when the milk enters the body, for example—the germs restart their deadly work. Refrigeration improves keeping quality but provides no safety from disease germs.


To cooling sections of plates
Bulb of cold-milk recorder
Bell valve
Bulb
Operating arm and spindle
Check thermometer
Diverted-milk pipe to balance tank
Holding tube

The flow-diversion valve assembly of a plate-type pasteuriser.

"Is there really such a thing as a milk-borne disease?"

The chances are that the people who doubt the existence of milk-borne diseases because they have never seen a case of one have never met a person who has suffered from diphtheria either, yet there is no doubt of the damage caused by diphtheria. In 1948 in New Zealand as many people contracted milk-borne diseases as contracted diphtheria. The danger of milk-borne disease is ever present where raw milk is consumed, and the extent of the danger is realised only dimly by the average milk consumer. Sometimes people admit that such a danger exists but imagine that because of some special dispensation of Providence milk-borne disease could not occur in New Zealand. It could occur and it has occurred—in epidemic form, moreover. Here are two cases:—

In February, 1942, a sharp outbreak of typhoid fever occurred in Otahuhu, near Auckland. The total number of cases located was 26, some of them being very severe and 4 deaths resulting. The source of infection was traced to a dairy farm supplying a depot at Otahuhu from which raw milk was distributed to customers. A member of the family occupying this farm proved to be a carrier of the typhoid germ.

In October and November, 1947, an epidemic outbreak of typhoid fever occurred in Kaikoura, a township in the South Island midway between Blenheim and Christchurch, 78 cases being notified, of which 3 were fatal. A prompt investigation indicated that the local raw-milk supply was the presumptive means by which the infection was spread, a temporary water supply to the dairy farm concerned being susceptible to contamination from a person who had been a typhoid case 10 months previously. In the words of the Department of Health's report: "Prompt pasteurisation of the milk was arranged for, and the outbreak terminated almost as suddenly as it had begun."

"There is not really much risk in drinking unpasteurised milk."

The same remarks can be made here as were made in answer to the previous objection. The risk is always there, and is only too well realised by people who have seen or known the unfortunate victims of milk-borne diseases.

"If pasteurisation was made compulsory, farmers might slow down their efforts to improve milk-production conditions."

This sort of statement is usually made by people who have little appreciation of the efforts made by the good dairy farmer to produce first-class milk. No farmer taking a pride in his work would lower his production standards because he knew his milk was going to be pasteurised when it reached the treatment station. No milk-treatment station manager would continue to accept milk on behalf of consumers from a farmer whose milk showed continued deterioration under the laboratory tests performed on it.

"The country cannot afford pasteurisation."

If the 35,000,000 gallons of milk sold under the town-milk scheme to milk consumers in New Zealand during the past year had been pasteurised the gross cost to the country would have been £150,000. According to a booklet published by Dr. R. S. R. Francis in 1949 on "The Control and Treatment of Tuberculosis in New Zealand," the gross cost (that is, the total loss) to the community of the treatment of tuberculosis is £5,878,280 each year. During 1948 2085 cases of tuberculosis were recorded in the annual report of the Department of Health; of this number 325 were cases of non-pulmonary tuberculosis. Assuming half of these cases to have been caused through milk-borne infection, 160 of the 2085 cases would represent a gross cost to the country on the figures given by Dr. Francis of £450,000—three times the cost of pasteurising all the milk. Moreover, all the other benefits of pasteurisation—that is, the avoidance of the other dangers inherent in raw milk through other milk-borne diseases—would still have been gained at no extra expense.

However, apart from figures and estimated costs, which at best can be only approximate, no one could say truthfully that the cost of pasteurisation is too great. If the pasteurisation of milk saves but one life, who can say what the value of that life would have been? The total cost of pasteurisation represents only ⅛d. per pint of milk, or slightly less than 3 per cent. of the over-all cost.

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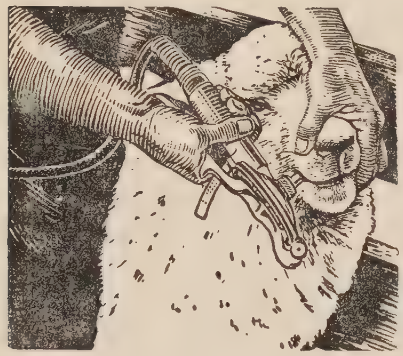

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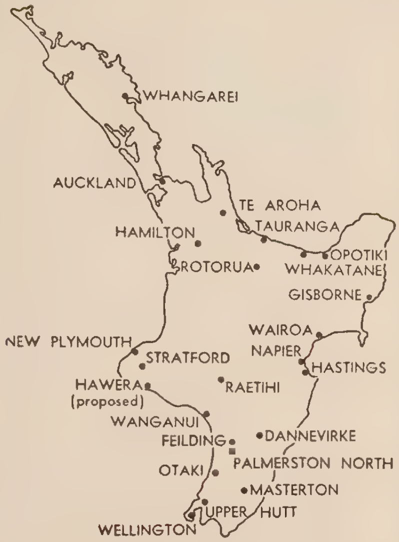
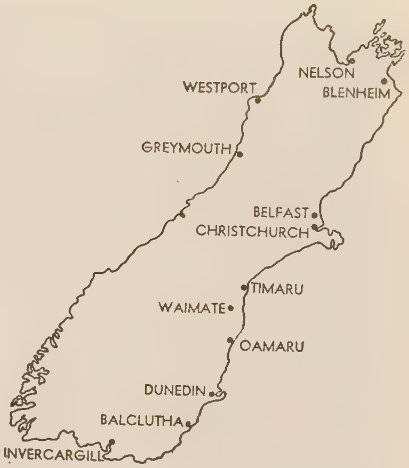
THE PASTEURISATION OF TOWN MILK



The cities and towns shown in these maps are those in which milk-pasteurising plants are operating in New Zealand. Pasteurised milk is available in all these places and usually in nearby towns as well. For example, Otaki supplies Levin, Blenheim supplies Picton, and Nelson supplies Motueka. Customers should make every effort to buy pasteurised milk in bottles which have been filled and capped at the milk-treatment station. Buying milk loose is unwise, as it is then subject to recontamination.



"Pasteurised milk does not go sour, it goes rotten."

Early in this article it was made clear that milk is very susceptible to bacterial contamination, few germs being present in milk as it leaves a healthy cow. The most common of the germs which get into milk come from the surrounding air and are of a type which ferments the sugar in milk, changing it into lactic acid. Raw milk usually has a preponderance of this type of bacteria.

When such milk is left to sour, lactic acid continues to develop and at a certain point causes the milk to curdle with a characteristically soft, smooth curd formation. However, these lactic acid-forming organisms are easily destroyed by heat and do not survive pasteurisation temperatures. Bacteria which act on the protein in the milk instead of the milk sugar survive heat much better. Though equally as harmless as lactic acid-forming bacteria, these peptonising bacteria cause a different type of curdling in pasteurised milk, sour pasteurised milk showing a distinct formation of curd and whey. Sour pasteurised milk is as healthful as sour raw milk, with the added advantage that it is safer from a health point of view.

"The taste of pasteurised milk is unpleasant."

It has been well authenticated that under conditions of fair comparison not one person in a hundred can distinguish pasteurised milk from raw milk by taste. If pasteurised milk can be distinguished by taste, it is an indictment of the manner in which pasteurisation has been carried out, not of the principle of pasteurisation. Too high a pasteurising temperature or too long a holding time gives pasteurised milk a burnt or caramelly taste; that should be deplored, but it may be added in extenuation that the milk is still safer from a disease point of view.

Many people think they can detect a characteristic pasteurised taste in milk when in fact the taste they get is the cardboardy or tallowy taste imparted to milk by the effect of direct sunlight.

If a bottle of milk is left in the sun's rays for as short a period as an hour, the milk develops this cardboardy taste; the longer it stays in the sun the worse it becomes and after several hours' exposure it is practically undrinkable. A bottle of milk should not be exposed to direct sunlight either outside or inside the home; if it is, the resulting taste has nothing to do with pasteurisation.

"Pasteurisation takes the goodness out of milk."

Though pasteurisation can effect some small changes in the minor constituents of milk (for example, the vitamin C potency is reduced slightly), the variation thus caused is considerably less than the variations ordinarily found in commercial raw milk. Moreover, though a number of carefully controlled experiments have been carried out to ascertain whether pasteurisation causes any measurable dietetic defect in milk, no such defect has yet been discovered.

"Some doctors say raw milk is better for health than pasteurised milk, so who is to be believed?"

Doctors who recommend raw milk in preference to pasteurised milk are in a small minority. The official medical attitude of the Department of Health is specifically in favour of pasteurised milk, and the Department, needless to say, represents a considerable body of enlightened medical opinion.

The supporters of pasteurisation in the medical profession are in an overwhelming majority, and in most countries of the world the medical profession itself has brought about the compulsory pasteurisation of town-milk supplies.

"Pasteurisation is used only to make bad milk good."

Such a statement is a libel on the farmer, the milk processor, and every official connected with public health. It cannot be emphasised too strongly that pasteurisation only makes good milk safe—it can never make bad milk good. The ideal milk for pasteurisation is that produced from disease-free cows under hygienic conditions.

Responsibility on Parents

An indictment of raw milk is not an indictment of the dairy farmers producing it but an admission of human frailty. In the present stage of knowledge raw milk cannot be guaranteed to be always free of contamination on its journey from the cow to the consumer; with pasteurisation that guarantee can be given.

In New Zealand at present a milk consumer is permitted to choose raw or pasteurised milk, so a deep responsibility rests on the shoulders of the parent who chooses unpasteurised milk for children. Pasteurised milk is available in most towns in New Zealand. If pasteurised milk cannot be obtained in places shown on the maps on this page, the fact should be referred to the Department of Health or the Department of Agriculture, or, if there is a milk board or milk committee in the area, the secretary or chairman should be approached.

New Zealand dairy farmers are sparing no effort to produce town milk of a quality higher than anywhere else in the world; the milk-treatment stations are re-equipping themselves with the latest and most efficient milk-processing plants available; and the vendors are giving as prompt a delivery service as is enjoyed in any country. All these plus pasteurisation spell health and safety.

Preparations for Wintering Bees: Prevention of Robbing

Seasonal Notes for the Domestic Beekeeper

THE methods most suited to the domestic beekeeper in the prevention of robbing by bees and the preparation of colonies for winter are described in this article by R. Goddard, Apiary Instructor, Department of Agriculture, Tauranga.

AT the end of the honey flow the hives are usually full of field bees with little to keep them fully occupied. It is at this time that robbing is likely to become prevalent in the apiary and the bees may become troublesome. The majority of domestic beekeepers have their apiaries situated in or near closely populated areas and to avoid becoming extremely unpopular with neighbours they should do all in their power to prevent robbing by bees.

In many parts of New Zealand nectar supplies available to bees have finished earlier than usual this season. Consequently, the domestic beekeeper must take more care. All hive manipulations should be carried out quickly and the colony closed down as soon as the operations are completed. Extreme care should be taken to ensure that combs of honey and pieces of burr comb containing honey are not left in places which are accessible to foraging field bees. Above all, on no account place supers containing wet combs in the apiary during the day, as this undoubtedly will excite the bees and cause widespread robbing which will be difficult to control. If it is desired to clean out wet supers, it is recommended that they should be placed together quickly and quietly on top of a hive in the evening. They may be removed later for storage when the bees have cleaned the combs of all liquid honey.

Detecting Signs of Robbing

Weak hives, and especially nucleus colonies, should be watched carefully for signs of robbing. Keen observation will soon enable the domestic beekeeper to distinguish robber bees, which fly nervously round the hive searching for some unguarded entrance. Bees usually take flight direct from the alighting board, but if they are noticed crawling up the side and front of the super before launching into the air, it is a good indication that robbing is in progress. If it is noticed that a hive is being constantly attacked and robbed, it is sometimes advisable to exchange the places of the robbed and the robbing hives. This manoeuvre apparently demoralises the bees and robbing usually ceases.

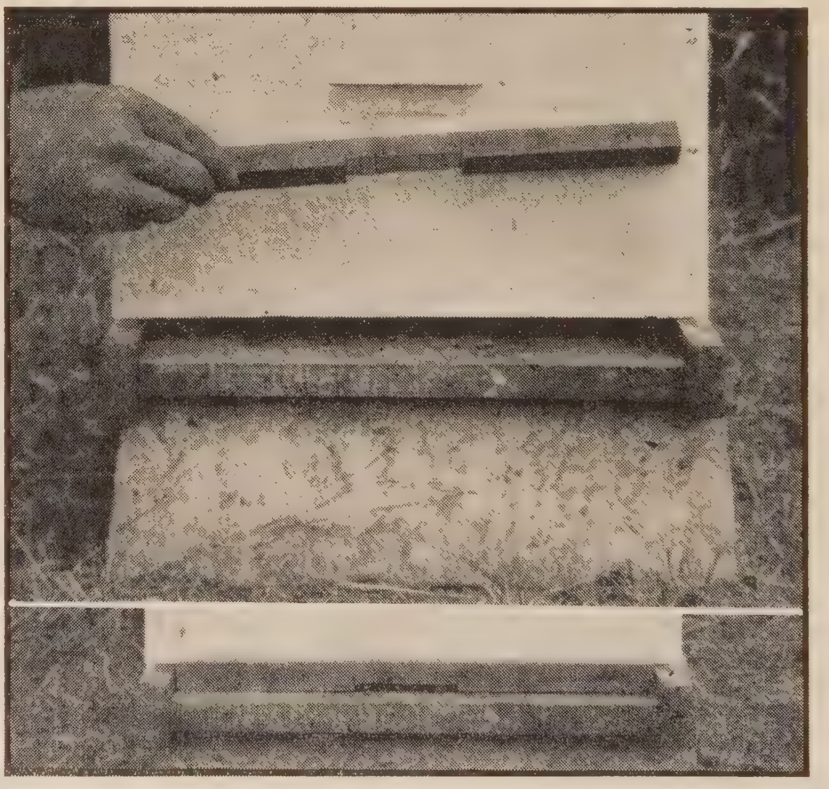
Preparations for Winter

Hives which winter successfully are in good condition for the coming season and with this point in view domestic beekeepers should prepare their colonies. Although the amount of stores which should be left on the hive for winter feeding varies in different localities, it is generally considered that 40 to 50lb. of honey is sufficient. Each fully-capped comb usually contains approximately 5 to 6lb. of honey and it is therefore quite a simple matter to calculate the amount of honey in the hive. Two or three frames of pollen, which is the bees' protein diet, must also be available in each hive.

To carry out this check on the amount of stores in a hive it is necessary to open it, and in the course of the examination it is advisable to glance quickly at each comb and to remove all that are damaged and in need of repair. Drone brood comb should not be tolerated, as it will result in an excessive amount of drones being produced in spring, a condition which may cause premature swarming in the apiary. If, during the manipulations, a hive is found queenless, it should be united immediately with some queen-right colony. Queenless colonies seldom survive a winter.

Examine all hive equipment, boxes, lids, and bottom boards thoroughly and any showing signs of damage or in need of paint should be replaced. It is advisable to remove the queen excluder and all empty supers and to winter the colony in two boxes. In this confined space bees are enabled to cluster more readily and unnecessary draughts are avoided. Care should be taken to ensure that the hive is not placed on land susceptible to winter flooding and it is recommended that all hives be raised off ground level by means of bricks or concrete or wooden foundations. This allows a free flow of air underneath the hives, thus avoiding damp conditions and the rotting of bottom boards.

Bees slowly but surely leave the bottom box during winter and many domestic beekeepers have found to their dismay that mice have occupied the deserted box and wrought such havoc that the combs are virtually useless. The most satisfactory method of preventing this damage is to restrict the hive entrance by means of a block of wood placed across the breadth of the bottom board. A small space chipped out of the centre of the wood will allow the bees to move freely in and out of the hive. In the event of robbing the mouse-guard serves yet another purpose in that with the smaller entrance to guard the bees can easily defend themselves against attack.



[Rendell's Photo Service photos.

Upper—Mouse guard to a hive entrance being placed in position. Lower—The guard in place.

The Culture of Chinese Gooseberry Vines

NOT many years ago the Chinese gooseberry was a little-known fruit to most New Zealanders. However, in recent years commercial production has developed in temperate districts where citrus fruits and tree tomatoes thrive, and because of its many uses the Chinese gooseberry is now better known and becoming increasingly popular. The fruit ripens during winter and is a welcome addition to the limited kinds of fruit available then. The culture of the vines is described in this article by F. L. Bailey, Orchard Instructor, Department of Agriculture, Tauranga. The fruit may be used for a variety of culinary and dessert purposes, some recipes for which are given in an article on page 285 of this issue.

[*Sparrow Industrial Pictures Ltd. photo.*

A well-laden Chinese gooseberry vine bearing even-sized fruit of a desirable type.

THE Chinese gooseberry (*Actinidia chinensis* Planch) belongs to the botanical family *Dilleniaceae.* It occurs naturally as a deciduous fruiting vine growing to a height of 30ft. or more on the forest margins in the mild-wintered Yangtze Valley of China. When cultivated under favourable conditions in New Zealand this vigorous twining vine grows to large proportions if not controlled.

Unlike most fruits, Chinese gooseberries are not attractive in appearance. The berries are a nondescript brownish colour and the skin is hairy. They vary considerably in size with strain and cultural treatment. When ripe the fruit has a rich, delicate flavour and can be used for dessert purposes and for making jams and chutneys. It is rich in vitamin C and is recommended by medical authorities as a reliable substitute for orange juice for feeding to babies.

At present it is estimated that about 30 acres of Chinese gooseberries are under commercial cultivation in New Zealand, producing about 50 tons of fruit a year. This does not take into account the production from vines planted in private gardens for domestic use. Most of the plantings are young, and on present indications both production and commercial planting will increase steadily during the next few years.

Few if any growers specialise in growing Chinese gooseberries. Usually small areas are grown in conjunction with other sub-tropical fruits or on small holdings growing miscellaneous horticultural crops. The profitable life of a vine is difficult to gauge. On the evidence available at present there appears to be no reason why it should not be 25 to 30 years, or even longer, provided the vines are given normal care and attention.

Selection of Site

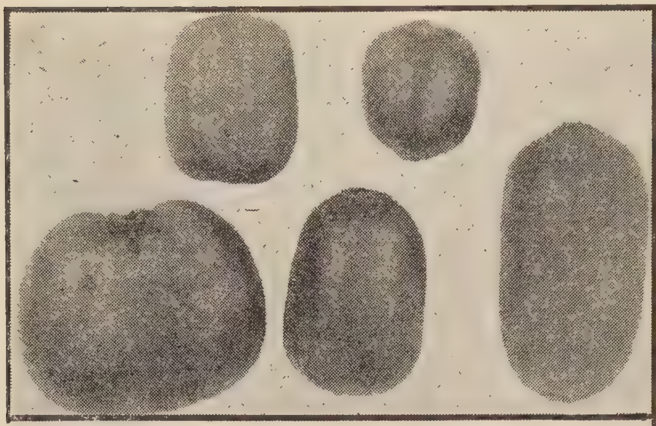
With most berry fruits proximity to markets is a major consideration when selecting a site for commercial planting, but the Chinese gooseberry has a fairly firm, well-protected skin and is capable of being transported long distances without damage provided the fruit is not too ripe. Though for economic reasons it is desirable to choose a site near the point of marketing and where transport facilities are adequate, that is less important than selecting a locality where soil and climatic conditions measure up to the standards required to produce the fruit on a commercial scale.

Being deciduous, the vines will withstand quite heavy winter frosts, but frosts during the growing period may cause considerable injury. If damaging frosts occur while new growth is starting during September-October, the growth is checked and the small flower buds in the process of development usually are destroyed. Very late frosts during the blossoming period at the end of October or during November will reduce or prevent the setting of fruit.

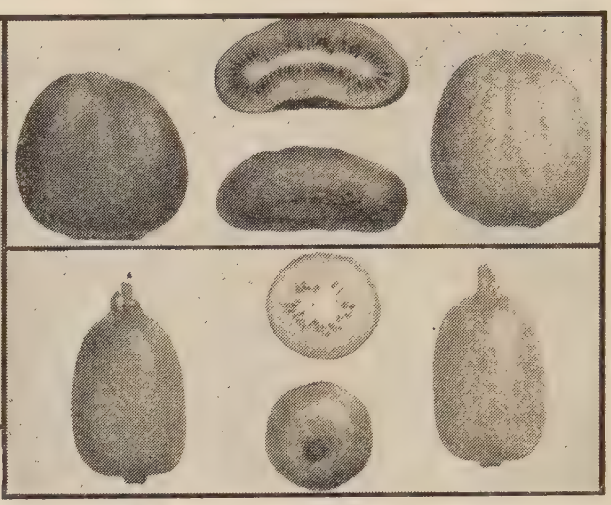
Because of the plants' susceptibility to frost damage during spring, areas suitable for the commercial production of Chinese gooseberries in New Zealand are somewhat limited. At present the fruit is grown commercially in the Kerikeri, Auckland, and Tauranga districts, where citrus and other subtropical fruits thrive, but the climate is quite satisfactory for production on a commercial scale in several other parts of the North Island. Suitable areas for extension include several selected parts of the east coast near Opotiki and Gisborne, in Hawkes Bay, and in parts of Taranaki Province near New Plymouth. In the South Island satisfactory production may be obtainable in districts not subject to damaging spring frosts, but at present commercial gardens are restricted to the Nelson district. In home gardens the vines will thrive in most districts in the North Island except the high country, and also in certain districts of the South Island, provided that planting is confined to favoured positions protected from spring frosts and cold winds. Light winter frosts do not appear to damage fruit on the vine and are said to be beneficial in improving the flavour.

Inexperienced growers who are doubtful about the suitability of the climate or a site for growing Chinese gooseberries should seek the advice of an Orchard Instructor of the Horticulture Division, Department of Agriculture.

THE CULTURE OF CHINESE GOOSEBERRY VINES



[Rendell's Photo Service photo.
Different strains of Chinese gooseberries may vary widely in size and shape.



[Sparrow Industrial Pictures Ltd photos.

Deep, fertile, well-drained soils which provide a cool moist root run during summer are most suitable for successful establishment. Heavy soils which waterlog in wet spells should be avoided, as the plants will not tolerate "wet feet" for long. Ample moisture is needed during summer to promote full development of the berries, and in excessively dry seasons irrigation would be an advantage in some districts.

Shelter Essential

During spring the young shoots make tender, prolific growth and at this stage are very easily broken off at their bases on the main rods of the vine. Therefore adequate protection from wind is necessary so that the number of laterals broken may be kept to a minimum and plant growth enabled to progress unchecked. Seldom is natural shelter sufficient to give adequate protection and it is essential to establish shelter belts where required. Usually, the southern and western boundaries need most protection.

In most parts of Auckland Province temporary shelter can be secured rapidly by growing *Albizzia lopantha;* if kept trimmed, it will prove satisfactory until permanent shelter has reached the stage where it becomes effective, when the *A. lopantha* may be removed. Good permanent shelter may be provided by *Cupressus lawsoniana, Cupressus benthami, Hakea saligna,* or *Cryptomeria japonica,* all of which give dense shelter to ground level. Several other varieties of shelter trees are satisfactory, but prospective growers would be well advised to plant shelter according to locality and be guided by the protection afforded by established hedges which have proved suitable for local conditions.

Strain of Vine

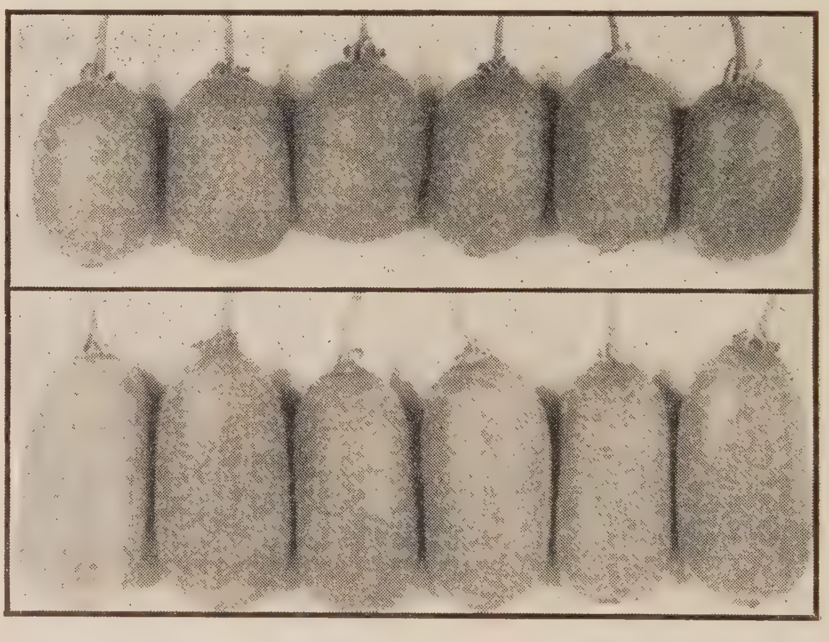
To produce a type of fruit that will command the attention of buyers the strain selected for propagation is of great importance to the growers. There are no recognised named varieties of Chinese gooseberries, but the types at present under cultivation vary considerably. Some fruits are round, some oval or elongated, and others are more nearly rectangular or square. Fruits of some strains contain a fibrous core, and a few have a hard, woody centrepiece which is not palatable. The colour of the flesh usually is an attractive shade of translucent green, but in some strains it is very pale—almost an insipid white.

For the propagation of plants for future commercial plantings or the reworking of unprofitable vines, growers would be well advised to confine their selection to strains bearing the large oval or elongated fruits illustrated. Care should be taken to ensure that the fruit is free from an internal fibrous or woody core and that the flesh is of the translucent green colour characteristic of the superior strains. Satisfactory returns have been received by growers who market fruit of the strains recommended.

Pollination

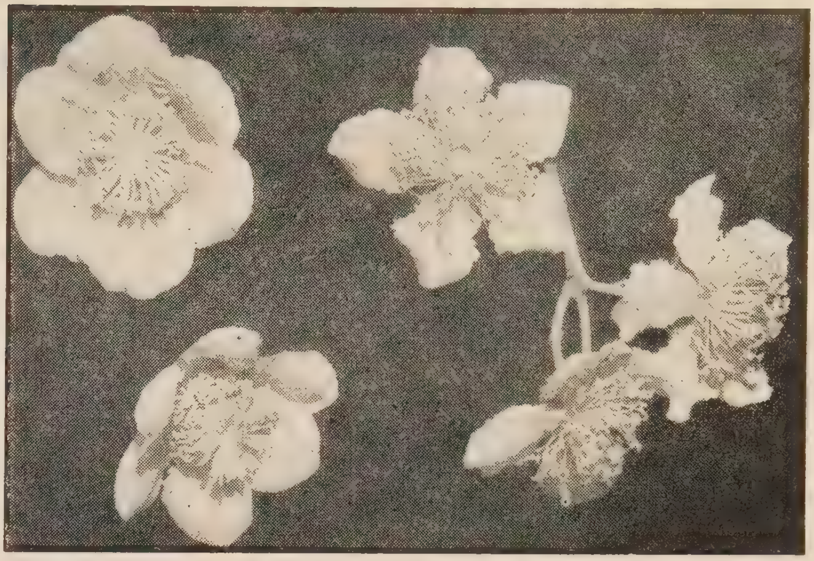
Chinese gooseberry plants are dioecious—that is, the sexes are carried on different plants. For the production of fruit, not only is it essential to have plants of each sex in any plantation for pollination purposes, but they must also flower at the same time.

The proportion of male plants to female varies with the method of planting, details of which are dealt with later in this article.



[Rendell's Photo Service photos.
Two even-sized types of Chinese gooseberries which are recommended for propagation.

PROPAGATING CHINESE GOOSEBERRY VINES



[*Sparrow Industrial Pictures Ltd. photo.*

Single female Chinese gooseberry flowers and a cluster of male flowers. The vines are dioecious—that is, the sexes are borne on different plants.

Propagation

The plants grow readily from seed, but that method of propagation is not recommended. Until the vines flower there is no reliable method of distinguishing male plants from females, and the variation in strain of the female plants produced is undesirable for commercial production. Grafting or budding are the only satisfactory methods of propagation to ensure good-quality fruit. In the past root grafting was used extensively, but because of the susceptibility to attack by the crown-gall organism at the graft union that method cannot be recommended.

Budding or grafting by the whip or tongue method on to seedling stocks is considered the most reliable method of raising the young vines. Propagating the plants from cuttings is unsatisfactory, as the cuttings form a poor rooting system and are also subject to attack by the crown-gall organism.

Raising Seedling Stocks

Well-grown fruit of a desirable type should be selected for seeding during the harvesting period and allowed to remain on the vine until fully mature. To mark the fruit and protect it from damage by birds, it should be covered with a piece of muslin tied in position.

Seed from selected fruits may be separated from the pulp by rubbing it with sand and then air dried. Some nurserymen sow fresh pulp, and this method has proved very satisfactory for raising seedlings provided the fruit is well ripened. With some fruits—for instance, tree tomatoes—water is added to the pulp, which is allowed to ferment, the seed then being washed in a small sieve and dried, but that is not recommended for Chinese gooseberries, as wetting the seed is likely to reduce germination.

The seed is very small and should be sown thinly under glass, preferably about the end of July. In the seedling stage the young plants are subject to attack by the fungi causing "damping off." Infection may occur in the root or at soil level, and as the fungi invade the tissues cells are killed, the stem becomes brown and shrivelled at soil level, and the weight of the top causes the plant to fall over. To minimise damping off it is advisable to sterilise the soil and seedling trays before planting the seed. After being sown the seed should be covered with finely sieved soil not more than ⅛in. deep.

When the seedlings have attained sufficient size they should be pricked out into seedling trays, and later, usually during October, the young plants may be lined out in nursery rows.

The nursery bed should be in a sunny and well-sheltered position and the soil worked down to a fine tilth. Seedlings should be set out in rows about 1ft. 6in. apart with 2ft. 6in. between the rows. A mixture of equal parts of superphosphate and blood and bone applied at the rate of ¼lb. a square yard to the nursery bed assists rapid establishment and growth.

Budding and Grafting

If the seedlings are big enough, they may be budded in the following March. For reasonable success and ease of handling the stocks should be at least ¼in. in diameter. Fully developed budwood from selected plants should be taken from the current season's growth and the leaves removed, leaving about ½in. of the petiole of each leaf for convenient handling of the buds. The buds should be carefully and cleanly cut from the bud-stick with a keen-edged knife and inserted in the stock about 4in. above ground level. The shield or T method of budding is used, and after insertion the bud should be bound firmly in position with raffia, specially prepared budding tape, or rubber bands.

During the dormant period, about the middle of July, the buds should be inspected and, if they have "taken," the stock should be cut back to just above the bud union. If this work is left until after growth starts, the vines will bleed.

When the buds begin to grow care should be taken to protect the young shoots from wind, for at this stage the growth is very brittle and easily broken. If the nursery bed is not adequately sheltered, the young plants require staking.

Some propagators prefer to raise plants by grafting, which is quite as satisfactory as budding. Selected wood, preferably the same thickness as the stock, should be taken from the parent vine during the dormant period and held in dampened sphagnum moss or sawdust until required. Grafting is best undertaken about the end of July or during August and should not be left until spring growth starts. The grafting wood should be cut into scions containing two or three buds, the wood at the base and the tip of each stick being discarded. The whip or tongue method of grafting gives the most satisfactory results. Full information about budding and grafting methods is given in Bulletins 81 and 285, which are obtainable free from any office of the Department of Agriculture.

The stock should be grafted about 4in. above ground level and the scion bound in position with raffia or rubber bands, after which a sealing material such as green crude petrolatum should be applied to prevent drying out at the union. When the graft has "taken" the raffia should be cut lightly with a sharp knife to prevent constriction at the union.

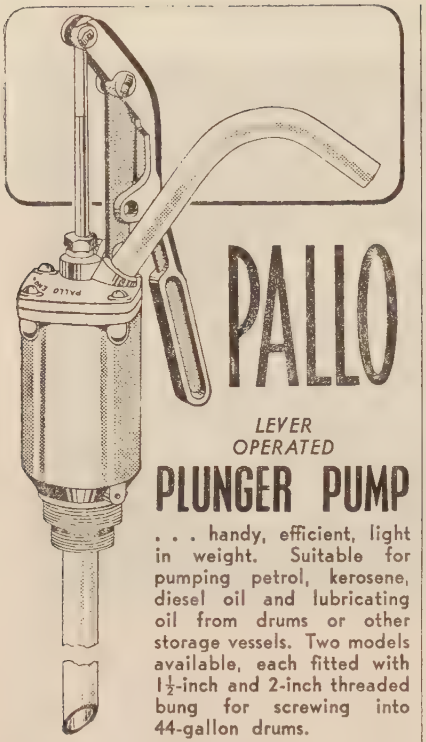
In both budding and grafting, care should be taken to segregate the male and female plants, as there is no reliable means of distinguishing the sexes until the vines produce flowers. The worked stock should be inspected periodically and any growths which develop below the bud or graft union rubbed off.

Reworking Mature Vines

In some plantations mature vines may produce small, inferior fruit of poor quality. That condition may be caused by neglect or poor cultural treatment, but very often it is the result of insufficient care in the selection of wood for propagation. The retention of such vines is uneconomic, and reworking to a desirable strain to produce a more attractive, marketable fruit is recommended.

Vines may be reworked by either budding or grafting, but grafting appears to be more popular. Wood to be used for reworking should be selected carefully from vines which have produced regular crops of fruit of a desirable shape and size. The procedure for reworking mature vines is the same as that described for the propagation of young vines. The difference between the two operations is that usually several grafts or buds are applied to a mature vine, depending on its size and shape.

It is advisable to complete grafting before the end of August. During September new season's growth begins, and though grafting can be carried out at this stage the sap is rising freely,



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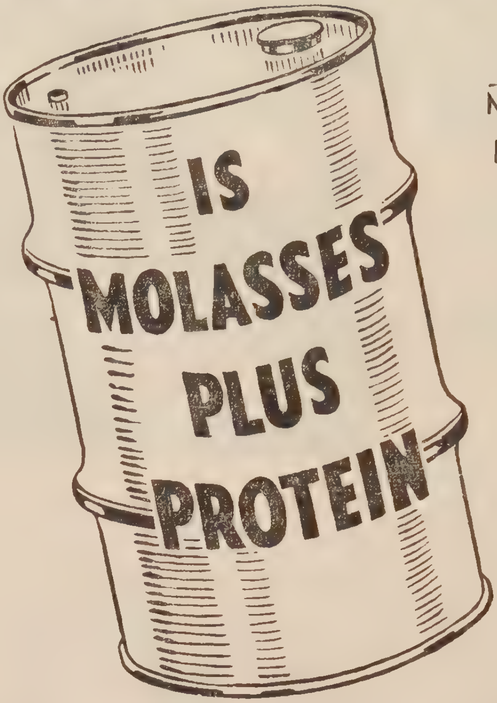

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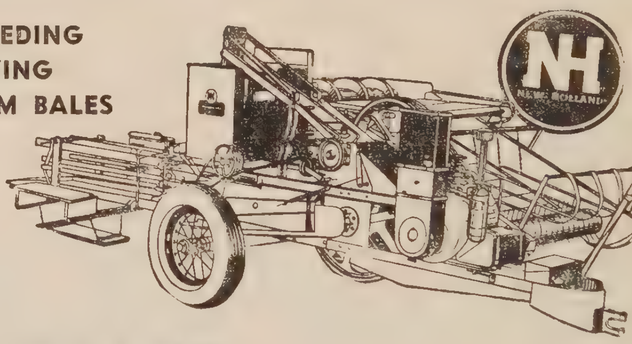

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and when the previous season's wood is cut the vine bleeds profusely. If several grafts are applied, the vine is likely to suffer. Furthermore, several old-established growers have found that grafts applied after spring growth starts, though they "take," frequently fail to survive.

Soil Preparation and Planting

Before the vines are planted the soil should be worked thoroughly so that root development may progress without check. As the Chinese gooseberry vine has a mass of shallow fibrous roots, adequate initial cultivation is necessary, for after the vines are set out deep cultivation must be avoided or valuable fibrous feeding roots may be destroyed.

If the land is in pasture, the area to be planted should be skim ploughed in early autumn and allowed to fallow for several weeks to enable the pasture sward to rot. About the end of May or early in June the land should be cross-ploughed to a depth of 6in., and on most soils carbonate of lime broadcast at the rate of 1 ton an acre would prove beneficial at this stage. Shortly before the plants are to be set out the soil should be disced and worked down to a fine tilth.

Plants are best set out during July to allow them time to become established and more able to withstand dry periods during the following summer. Instances have been recorded of spring-planted vines failing to establish satisfactorily.

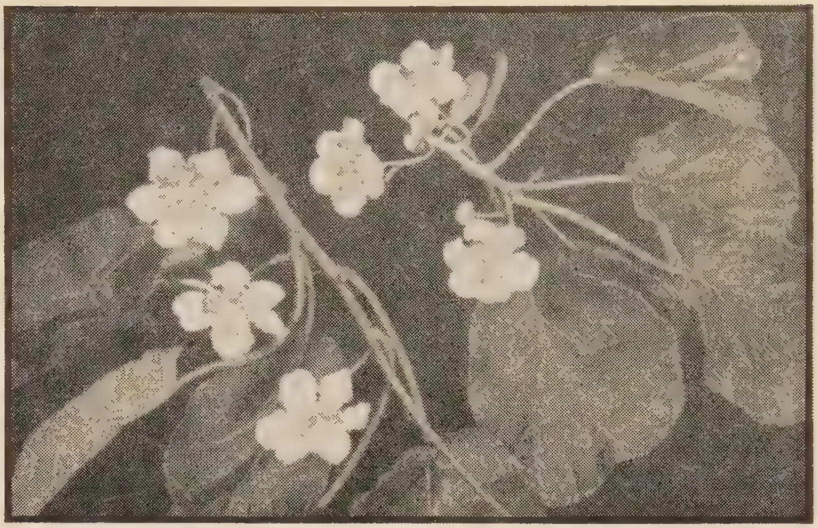
To give the vines a good start, a mixture of equal parts of superphosphate and blood and bone should be applied to the soil in the planting positions some 3 or 4 weeks before they are planted at the rate of 1½ to 2lb. a vine and well mixed with the soil. The rooting system of each vine should be examined before it is planted and any rootlets which are damaged or misshapen should be cut off. The vines should be set at the same depth as they were growing in the nursery—indicated by the soil mark on the stock—and it is important to tread the soil around the roots so that they are firm.

After being planted the vines should be pruned hard to promote vigorous growth. Well-developed plants may be cut about 12in. above the bud or graft union. Small or weak plants may need harder pruning.

Trellising the Vines

The Chinese gooseberry plant is a vigorous twining vine, and if growth is allowed to progress unchecked and the trellising of the vines is neglected, a tangled, twisted mass of vegetation will result. Vines so neglected ultimately become a liability, for valuable space on a holding is frequently lost and production is reduced to a low yield of small fruit.

For successful management the provision of a fence or trellis on which to train the vines is essential, and this aspect of Chinese gooseberry culture will be the subject of an article to be published in next month's "Journal." Double fence trellises are proving very satisfactory for crop yields and ease of management.



[*Sparrow Industrial Pictures Ltd. photo.*

Female (left) and male Chinese gooseberry flowers as they appear on the laterals at blossoming time. The foliage on male and female laterals is identical.

Vines grown on the overhead pergola system give a higher crop yield per vine than those grown on a fence trellis. Where space is restricted to a narrow area this method of trellising has advantages and on small holdings has proved a valuable method of growing the vines.

Planting Distances

In block plantings the distance between double fences is governed largely by the types of cultivation and spraying equipment to be used. With light equipment frameworks 10ft. apart would suffice, but where heavy equipment is used the distance may need to be greater.

The vines should be planted 25 to 30ft. apart in rows along the centre of each trellis. Planting closer than 25ft. eventually leads to overcrowding where growth is strong. Many vines have been planted with insufficient distance between them to allow adequate development. The result has been a hopeless tangle of growth which has made correct training and management of the vines almost impossible.

As male and female plants are required, the male plants should be arranged in an order that will afford the most efficient pollination. It is usual to space the male plants as evenly as possible over the whole area so that they are surrounded by female plants.

The proportion of male plants to female required for pollination varies. If the vines are planted in a single row along a boundary, as is done in some orchards, one male plant to every five females has given satisfactory results. With block plantings the male plants are "staggered" throughout the block and the proportion of males required may be reduced to one for every eight to ten females. The minimum proportion of male plants to females is not definitely known; it may be less than the number stated, but satisfactory crop yields have been recorded from blocks where male and female plants have been planted in the proportions given.

To give maximum rooting surface in block plantings, vines in adjoining rows should not be opposite each other but alternated.

Training the Vines

To furnish a trellis properly requires constant attention during the growing period when the young vines are developing.

With a fence trellis, suitably placed leaders should be selected and trained along the wires on either side of the main stem. Tying them with binder twine is preferable to twisting the leaders around the wires, because tied leaders prevent tangling and can be removed more easily when replacement becomes necessary. During the first year it is unlikely that sufficient growth will be produced to furnish more than the first and second pairs of wires. By the end of the third year, with normal cultural treatment, growth will be ample to cover the remainder of the framework.

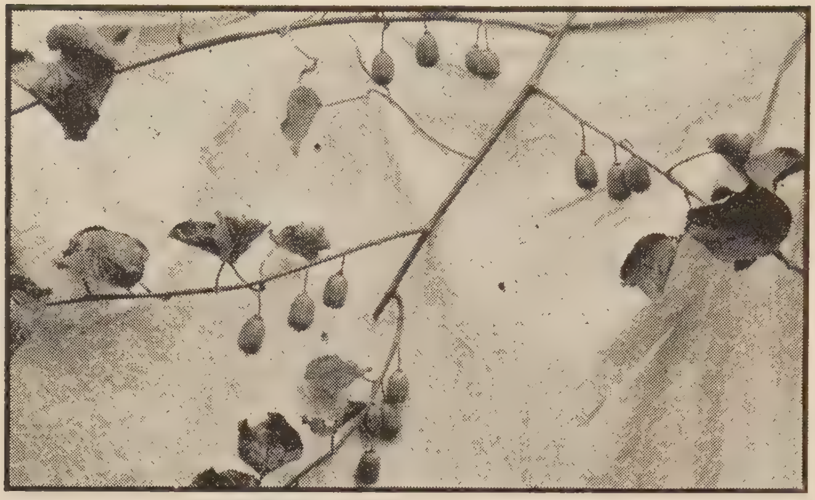
Vines planted along the centre of a flat-topped pergola should be trained, if possible, on single stems until nearing the top of the structure before being allowed to branch. Leaders produced should be trained over the canopy from the centre to each side of the pergola so that they run parallel at intervals of 1ft. 6in. to 2ft.

On whatever type of trellis vines are trained, surplus leaders should be suppressed to prevent overcrowding.

Winter Pruning

Winter pruning should be started in July after the crop has been harvested and when the plants are dormant. If it is left until late winter or early spring, sap exudes from the cuts and may cause a considerable loss of valuable wood through its dying back.

PRUNING CHINESE GOOSEBERRY VINES



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The fruiting habit of the Chinese gooseberry vine. Fruit develop from the first three to five buds of the current season's growth.

The fruiting habit of the Chinese gooseberry in many ways resembles that of the grapevine. The fruit develops on the current season's growth from the first three to five buds. Either or both of the following systems of winter pruning may be carried out with mature vines:—

The leaders, which bear the fruiting laterals, may be removed and replaced by tying down well-grown leaders of the current season's growth.

The fruiting laterals may be shortened to two buds beyond where the last of the previous season's fruit was borne.

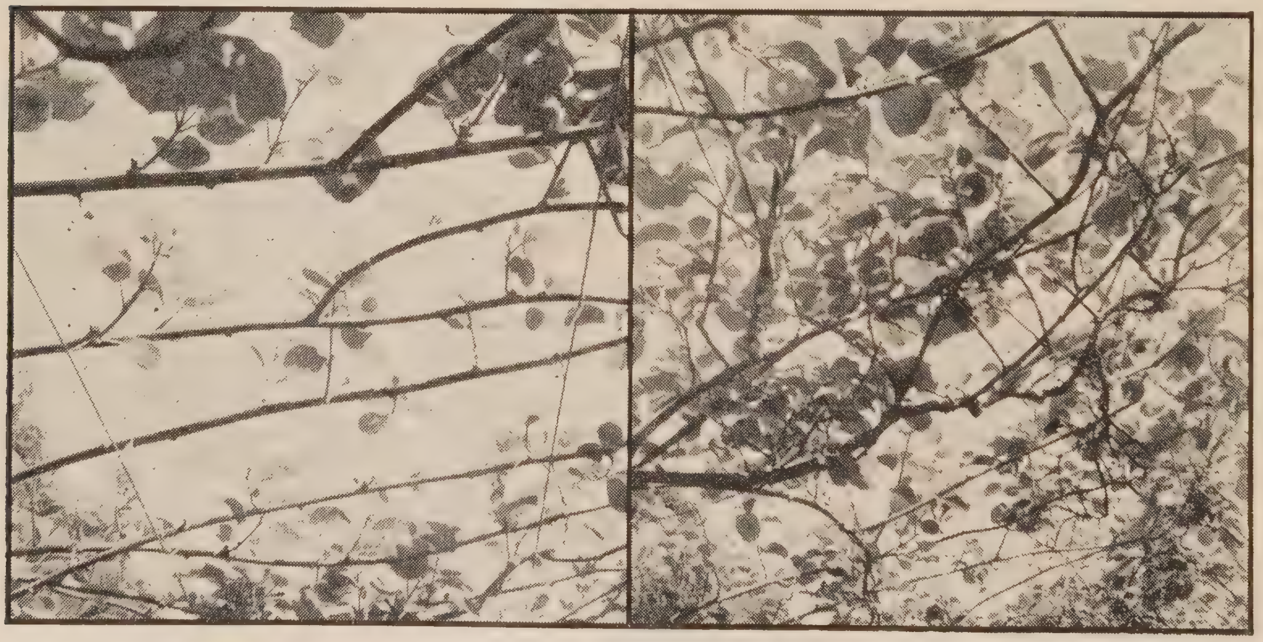
The system adopted depends on the growth produced, but usually a combination of both is necessary. The aim should be to tie down as many new leaders as are available as nearly horizontal as possible and remove those which have fruited. In established plantations the best quality and quantity of fruit invariably is produced on these new leaders the following season.

Because of lack of suitable growth, replacing leaders which have fruited is not always possible. Then it becomes necessary to shorten the fruiting laterals to two buds beyond where the last of the previous season's fruit was borne. Seldom do both these buds "break" in spring; the top bud grows and produces fruit while the lower bud usually remains dormant. The purpose of leaving two buds is to prevent loss of crop should the top bud be destroyed in its dormant state or when the young shoot develops. If it should be damaged and growth is prevented, the lower bud invariably will "break" and fruit.

If laterals are too dense, they should be thinned by cutting them back to the main leaders to prevent overcrowding.

The system of shortening fruiting laterals each winter has limitations. As fruit is produced only on the current season's growth, each year it will be further removed from the main leaders. The result is that after about 3 years the vines become cluttered with laterals of considerable length of which only a short portion at the end of each bears fruit. Replacement of leaders should be left no longer than three seasons or the vines become overgrown, the fruit becomes reduced in size and quality, and the trellis becomes covered with unproductive wood.

On old vines where difficulty is experienced in replacing leaders this may be accomplished by cutting back the fruiting laterals to a stub, leaving two basal buds. The process is sometimes known as "skeletonising" and is similar to spur pruning of grapevines. However, unlike the grapevine the Chinese gooseberry in these circumstances very seldom produces fruit on the new growth until the second season. The new growth should be pruned normally and the cycle of fruiting will begin again. Such drastic methods are seldom necessary to produce vigorous fruiting wood and



[*Rendell's Photo Service photos.*

Left—Leaders should be trained over a pergola at intervals of 1ft. 6in. to 2ft. Right—The tangling caused by insufficient attention to training.

should be avoided if possible, because they mean the loss of a crop of fruit.

Annual winter pruning is essential for regular crops of good-quality fruit. If pruning is neglected, the result is a tangled, twisted mass of growth, producing small, inferior fruit of little value.

Summer Pruning

Summer pruning is best undertaken in January, by which time the berries are well developed. Some growers tend to neglect this seasonal operation, and as a result growth becomes overcrowded and tangled. The free admission of air and sunlight is restricted and dense growth makes adequate spraying most difficult.

The main object of summer pruning should be to shorten fruiting laterals and to select and tie down temporarily growths that will form suitable replacement leaders. On fruiting laterals where growth is vigorous it is advisable to stop it several leaves beyond the last fruit by pinching out the tip; where growth is less vigorous stopping is not necessary. As future crop yields and quality of fruit depend on the production of healthy new growth, wood capable of forming leaders to replace present bearing wood should be selected carefully. They should be tied down temporarily in the desired direction as nearly horizontal as practicable and left unshortened. Final placement and tying should be done during winter pruning.

All vigorous non-fruiting growth made during the growing season should be shortened or removed if it is not required.

Manuring

As the vines grow and fruit prolifically on a small area, available plant food soon becomes exhausted unless fertilisers are applied regularly. Applications vary according to the quality of the soil and the method of training the vines. Mature vines growing on a pergola are larger and produce heavier crops than those grown on a fence trellis, and the larger vines require greater quantities of manure.

Many different kinds of fertilisers are used by growers of Chinese gooseberries, but on most soils regular applications of a mixture containing blood and bone and sulphate of potash have produced satisfactory growth and crop yields. The quantities given in the following table may be used as a guide for manuring young vines, but the quantities required by mature vines vary with size and crop yield.

Age of vines	lb. per vine annually	
	Blood and bone	Sulphate of potash*
2 years	3½	½
3 years	5	1
4 years	7	1½
Mature vines ..	Up to 25	Up to 5

* If sulphate of potash is not available, muriate of potash may be used at equivalent rates.

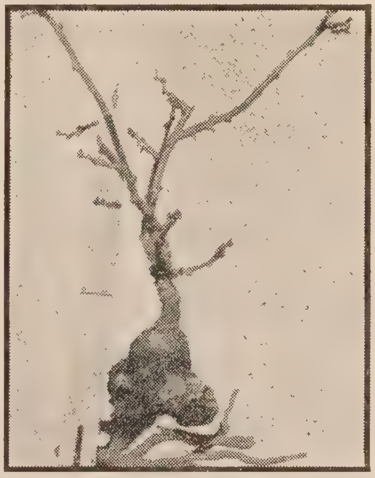
The sulphate of potash and half the blood and bone are best applied during August. The remainder of the blood and bone should be applied at the end of December or early in January and lightly hoed into the soil.

General Maintenance

Chinese gooseberry vines have extensive root systems. Fibrous feeding roots are near the soil surface and may be damaged easily by careless use of implements. Therefore maintenance cultivation should be shallow—just sufficiently deep to control weed growth and conserve soil moisture during spring and summer.

To enrich the organic content of the soil a green crop should be sown each year during summer or early autumn, the weather largely governing the time of sowing. Oats or blue lupins provide good humus and should be sown with superphosphate at the rate of 2 to 3cwt. per acre. The crop should be turned in during early winter, preferably with a rotary cultivator.

On light soils in the Kerikeri and Tauranga districts some orchards are maintained in permanent pasture or green crop, a cultivated strip being kept along each side of the rows of vines. In such orchards the sward should be mown at intervals and the mowings collected and used for mulching the vines. Mowing must be done regularly to reduce moisture transpiration in dry weather.



[*Rendell's Photo Service photo.*

A 4-year-old vine infected with crown gall. Growth has been checked severely.

Pests and Diseases

Until about 4 years ago there were no records of specific diseases attacking Chinese gooseberry vines in New Zealand. However, experience in recent years has shown that they are not immune from attack by diseases and insect pests, and control measures are necessary to guard against damage and loss.

Leaf Roller Caterpillar

The leaf roller caterpillar (*Ctenopseustis obliquana*) is one of the few insect pests attacking the Chinese gooseberry and can cause considerable damage to the fruit if control measures are neglected. The grub is active during late December and early in the new year, when it attacks the berries, usually where two or more are in contact. Frequently it eats a hole through the skin and into the pulp, but more commonly it makes shallow burrows or scarred areas on the surfaces of the fruit, causing an unsightly blemish and a tendency for the fruit to drop prematurely. The holes in the berries make them useless and scarring on the fruit detracts considerably from the market value.

The caterpillars can be controlled by spraying the vines with arsenate of lead (1½lb. to 100 gallons of water) or D.D.T. (½lb. to 100 gallons of water—that is, 2lb. of 25 per cent. or 1lb. of 50 per cent. D.D.T. spray powder to 100 gallons of water). The hairiness of the fruit makes satisfactory wetting and even spray coverage difficult, so a reliable wetting or spreading agent should be added to the spray mixture. Applications should be started about the third week in December and be continued at three-weekly intervals until February.

Thrips

The foliage of Chinese gooseberries may be infested by thrips (*Heliothrips haemorrhoidalis*) during late summer and early autumn, a silvering or even browning of the leaves resulting. Frequently the leaves are made more unsightly by small deposits of hardened brownish-black excreta from the insects. The thrips seldom cause damage of much consequence, but a heavy infestation may be controlled by spraying the vines with nicotine sulphate 1:800 plus summer oil 1:100 or with D.D.T. at a strength of 2lb. of 25 per cent. or 1lb. of 50 per cent. spraying powder to 100 gallons of water. Applying D.D.T. is not advisable within 3 weeks of picking the fruit.

Root Eel Worm

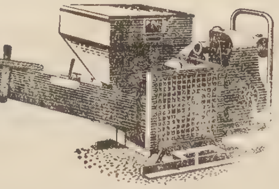
On the roots of Chinese gooseberries are sometimes found numerous nodules or galls caused by root eel worm (*Heterodera marioni*). Different kinds of plants are known to react differently to the presence of eel worm: Some can support a large population without showing any signs of distress, but others are very susceptible and infection may cause death. The presence of eel worm does not appear to restrict the vigour or crop yield of mature Chinese gooseberry plants and infection need not be viewed with alarm.

No measures can be taken to control infection in mature plants without damaging the plants themselves, but young vines should be examined carefully before they are planted and any that show galls on the roots should be discarded.

Crown Gall

Crown gall (*Bacterium tumefaciens*) in Chinese gooseberries is invariably associated with plants that have been propagated by root grafting or from cuttings. In young root-grafted plants infection occurs at the graft union in the form of a large wart-like knot, more or less circular in shape and sometimes up to 4in. in diameter. Infection on some mature plants does not appear to affect crop yield or vigour, but vines have been known to die from this disease.

To minimise chances of infection plants should be propagated either by budding or by whip or tongue grafting



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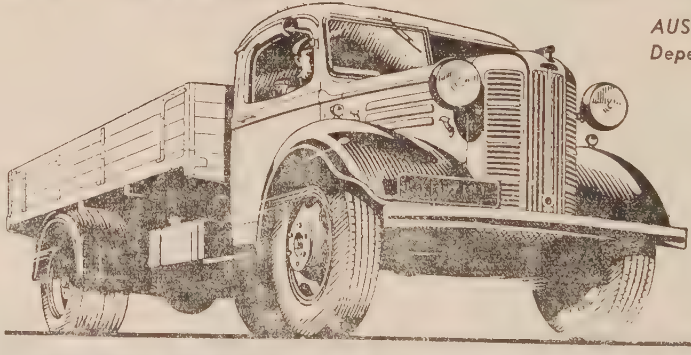

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on to seedling stocks. Plants propagated by root grafting should be avoided or, if planted, should be carefully inspected and any that show galls at the graft union destroyed. Crown gall is a serious disease of root crops, shrubs, and trees in other countries and is known to cause serious damage to some hosts in New Zealand, so a grower should avoid introducing the disease to his orchard by refraining from planting infected vines.

Leaf Scorch

A physiological disease, leaf scorch sometimes appears in summer and early autumn and is most frequently associated with hot, dry weather and strong winds. Usually the margins of the leaves become scorched and curl inward as the trouble develops. Sometimes the leaves become spotted and develop symptoms similar to spray injury, but this is usually a secondary condition and may be caused by a variety of fungi. The affected portions of the foliage become very brittle and disintegrate easily; if the trouble is severe, defoliation occurs.

No pathogen appears to be responsible for leaf scorch. Vines planted in exposed areas should be given shelter to make conditions more favourable for their growth.

Sprays for Domestic Gardens

Quantities of spray ingredients to be added to 4 gallons of water for treating vines growing in domestic gardens are as follows:—

1oz. of 50 per cent. or 2oz. of 25 per cent. D.D.T.

1oz. of arsenate of lead and 2oz. of hydrated lime.

4/5 fl. oz. (5 teaspoons) of nicotine sulphate and 6½ fl. oz. of summer oil.

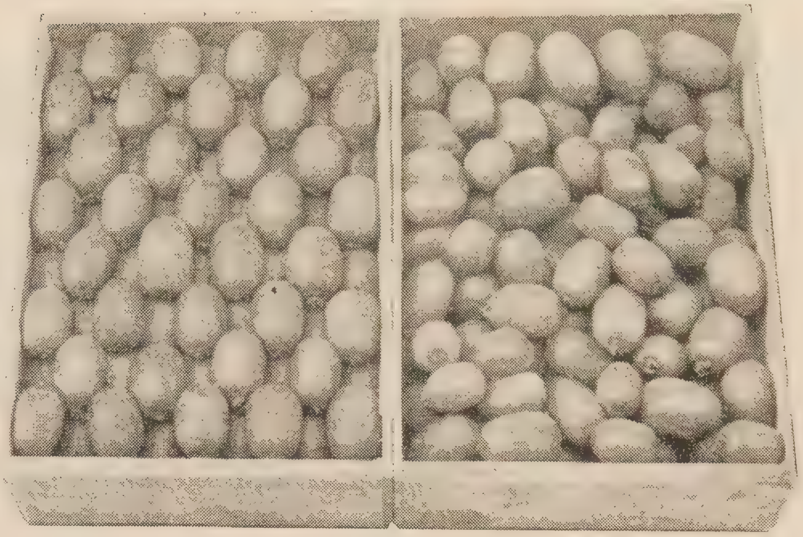
Harvesting

Harvesting of the fruit usually starts at the beginning of May and continues until July.

> **Some growers, seeking high values, have been harvesting and marketing fruit early in March. That cannot be condemned too strongly, as such fruit is immature and unfit for either culinary or dessert use. As yet many people have not acquired a taste for Chinese gooseberries, and selling immature fruit to a consumer is a sure way to create a dislike and jeopardise the potential demand.**

In some seasons a small quantity of fruit may be ready for harvest during the latter part of April, but generally it is best left until May.

The fruit should be picked to size, the larger berries being harvested first to relieve the weight on the vines and allow smaller berries to increase in size. Several pickings are necessary during the harvesting period. Early in the season the fruit is high in pectin, at which stage it is useful for preserving. Much of the pectin content is lost later, and in early July berries remaining on the vines become soft and are readily damaged by small birds. As winter pruning should be started in July and as the birds are likely to damage the fruit, harvesting should be completed early in that month.



[*Rendell's Photo Service photo.*

"Jumble-packed" fruit lacks the attractive appearance of a well-packed case of Chinese gooseberries.

Some growers prefer cutting the fruit from the vines with lemon clippers or secateurs to pulling it. If this method is used, the stem should be cut flush with the button to prevent stem punctures.

Fruit not required for immediate marketing should be kept in a cool, draught-proof store to prevent withering and be marketed before it becomes soft. Under suitable storage conditions some fruit can be held until the end of August or the beginning of September.

There are indications that it may be possible to hold Chinese gooseberries satisfactorily in cool storage. Some preliminary work has been undertaken, but as yet no complete information is available about the storage performance of the fruit. If fruit can be held in cool storage for long periods without deterioration, growers will be able to market more even supplies over a longer period.

Packing

No standard package for Chinese gooseberries has yet been adopted, but the No. 8 tomato case in the schedule of standard packages in the New Zealand Grown Fruit Regulations, 1940, has proved a satisfactory container. This case, which has inside measurements of 4½in. x 12in. x 16in. and holds about 20lb. of fruit, is recommended.

The fruit should be graded to size and packed on the diagonal-pocket system, which places the fruits in any layer in the spaces between the fruit in the layer beneath. Packed on this system, the fruit presents an attractive appearance when the case is opened and bruising or damage to the contents during transit is reduced.

The use of green lining paper enhances the appearance of the package and frequently adds to the market value. Neatly branding the railing or shipping mark on both ends of the case simplifies any sorting necessary during transit and frequently avoids unnecessary handling of the fruit. To prevent possible misdirection, care should be taken to use correct abbreviations for railway stations to which consignments are dispatched; the Railways Department will provide information about recognised abbreviations.

The name of the fruit and some indication of the size, such as "large," "medium," or "small," should be stamped or stencilled on one end of the package.

Not a Difficult Crop

If soil and climate are suitable, Chinese gooseberries are not difficult to grow. Disease control is a minor item, and in this respect production costs are lower than is usual with most other vine fruits.

> **For successful production it is essential that the vines be grown on a solidly built trellis and that adequate and regular attention be given to training and pruning.**

No grower should attempt to grow more vines than can be handled conveniently. A few vines well grown and tended yield a satisfactory financial return, but because of their extreme vigour ill-tended vines can quickly "take charge" and become a liability.

Acknowledgment

The assistance of officers of the Plant Diseases Division, Department of Scientific and Industrial Research, Auckland, in checking the sections dealing with pests and diseases and recommendations for their control is acknowledged.

Reference

F. Sydenham—"Cultivation of the Chinese Gooseberry," "The New Zealand Journal of Agriculture," February, 1944.

* * *

CARE OF LIVESTOCK DURING APRIL

Contributed by the Animal Research Division.

CARE OF CALVES

THE best way to prevent calves from dying during the winter is to treat them properly during the autumn. They should never spend more than 2 or 3 days in one paddock and should be rotated ahead of the cows through the best paddocks available. Good-quality hay should be provided for them daily, especially when the feed is growing fast after autumn rains. At the first sign of scouring they should be drenched with phenothiazine.

* * *

DRYING OFF DAIRY COWS

A dairy cow requires a reasonable spell between lactations and should be dried off at least 6 weeks before she is due to calve. This should be done even if she is still milking heavily.

* * *

AUTUMN-SAVED PASTURE

Early-calving cows are nearly always short of feed during July and August and often during September. In most seasons pasture is not growing fast enough during these months to meet the requirements of milking cows. Crops are expensive to grow and concentrates are even more expensive to buy. It costs nothing, however, to shut up pasture in the middle of April and let it grow for use in early spring. About one-sixth of the dairy area should be shut up in this way. Full instructions regarding the best paddocks to spell and the best method of feeding autumn-saved pasture by the use of electric fences will be found in an article on page 177 of the February, 1949, issue of the "Journal."

* * *

DECEMBER-FARROWED PIGS

Litters farrowed in December should be sold as pork. If they are carried on to bacon weights, no milk will be available for later litters, which will have to be sold cheaply as stores or wintered on expensive concentrates. Available root crops may be fed to sows, but they require supplementing with milk or meat meal.

* * *

CARE OF EWES

If rams remain with the ewes for more than 4 weeks, they should be raddled on the brisket so that the late lambing ewes can be drafted off. Once the ewes are in lamb their level of feed should be lowered to prevent their becoming too fat. By increasing the rate of stocking during the autumn some paddocks can be shut up and pasture allowed to grow for grazing during the 3 weeks before lambing. These measures will assist greatly in reducing "sleepy sickness," which is most prevalent in fat ewes which are inadequately fed just before lambing.

CARE OF LAMBS

If the summer and autumn have been wet, lambs are likely to be suffering from worms. Drenching with phenothiazine two or three times at 3-weekly intervals will help. This applies particularly to the tail of the flock, which should be drafted off for special attention. Feed, however, is the most important consideration. During the autumn lambs do best if grazed on pastures which have been allowed to grow to a height of about 6in. Hay aftermath and red clover are both very good, but if these are not available the lambs should be distributed thinly over the dairy paddocks or on hill pastures. They should on no account be concentrated in large numbers on short, rapidly growing pastures, especially if these have previously been grazed by ewes and lambs.

* * *

THISTLE POISONING OF CATTLE

Serious mortalities have been reported where hungry cattle have been grazed in paddocks very heavily infested with winged or variegated thistles. If it is not possible to cut and remove these from the paddocks, care should be taken to see that hay or other food is available so that the thistles do not constitute a large proportion of the diet. If any cattle grazing in infested paddocks are found to be distressed and breathing heavily, all the cattle in the paddock should be moved very quietly into a clean paddock and veterinary aid should be enlisted immediately. Fuller details on this subject will be found in an article entitled "Nitrite Poisoning in Cattle and Pigs" published in the April, 1947, issue of the "Journal."

* * *

RED WORMS IN HORSES

Red worms can seriously reduce the efficiency of working horses and are responsible for many deaths in foals. Phenothiazine is a very effective remedy, but is best given under veterinary supervision, as in certain conditions it may prove dangerous. Treatment should be administered before the winter.

General Uses of Cement and Concrete

IN the four previous articles in this series H. W. T. Eggers, Engineer, Department of Agriculture, Wellington, described the properties and methods of working concrete, the construction of reinforcing and forms, pre-cast products such as blocks and fencing posts, and the concreting of foundations, yards and paths, and retaining walls and dams. This article, which concludes the series, deals with the general uses of cement and concrete.

Applying the finishing coat in 2-coat plaster work on a bank. The bank is stable and the plaster coats are used in place of a retaining wall.

ORDINARY cement is a product of limestone, and its hardening action is the result of its chemical reaction with water. Cement, besides being used with water and graded aggregate to make concrete, can be used with sand and water to make mortar for joining brick or stone or building blocks, for plastering rough surfaces to produce a smooth finish, and for completing lath walls.

Whatever type of mortar is required, the basis is processed limestone, the products of different processes giving different types of mortar, which may be classed as follows:—

1. Cement mortar, consisting of cement and sand,
2. Lime and cement mortar, consisting of cement, hydrated lime, and sand, and
3. Lime mortar, consisting of hydrated lime and sand.

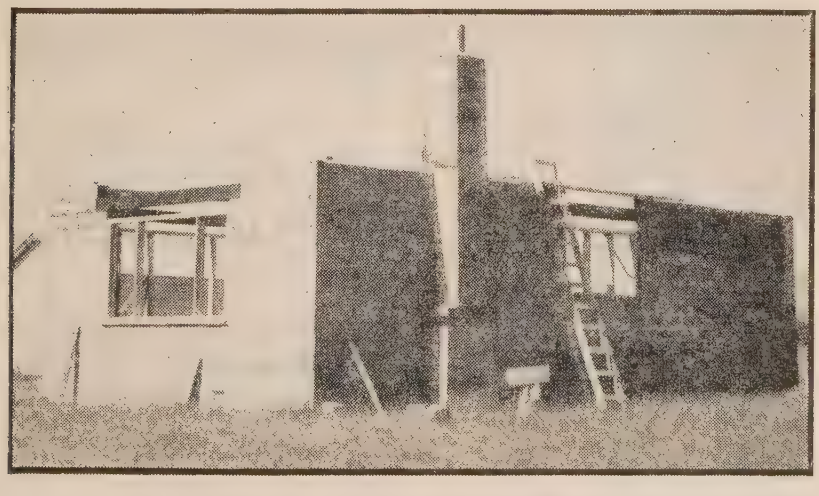
Lime when used with cement in varying proportions gives mortar of different characteristics suitable for various applications. Cement mortar, consisting of 1 part of cement to 2 parts of sand (1:2) or 1 part of cement to 3 parts of sand (1:3), is used for plastering paving, joining brick, stone, or block work subject to shock, and any other purpose where a hard-wearing or strong mortar is required. Lime and cement mortar is used for joining brick, stone, or block work, plastering brick, concrete, stone, or lath walls, and any purpose not requiring a strength as great as that of cement mortar.

Lime mortar hardens very slowly and should not be used for thick walls, for masonry under water or in wet soil, or in structures requiring great strength or which are subject to shock. Lime mortar is used reinforced with hair or fibre for plastering interior lath walls or with steel mesh against a backing.

For plastering purposes ordinary cement mortar, being "lean," is difficult to handle, and the addition of hydrated lime produces a "fatter" mortar; with lime mortar cement is added to give more rapid hardening.

As with concrete, the strength of mortar depends largely on the quality of the sand and on the coarseness of the grains. The sand must be clean and free from dust or any soft or flaky material and must not contain deleterious matter.

The four ingredients cement, lime, sand, and water can be proportioned and group treated to give a mortar best suited to the work in hand whether it is plastering walls, cementing bricks, stone, or blocks, or surfacing paving. The artisan bricklayer or plasterer who knows the characteristics of the materials he uses knows also the methods of working these materials to the best advantage.



A farm worker's cottage which is being constructed in pre-cast concrete blocks.

Other Uses of Cement

Cement, although always associated with concrete, is used for other purposes such as the stabilisation of earth (called soil cement), for the construction of earth dams, or for the manufacture of earth blocks for building purposes, described in the third article in this series. Cement is also used for grout, being forced under pressure into cracks and fissures of rock under dam foundations or behind tunnel linings for consolidation purposes. In a modern process cement mortar is blown by compressed air through a nozzle on to surfaces to be built up or plastered just as paint is applied with a spray gun.

Concrete

In this series of articles the whole question of the use of concrete has been treated very generally for the information of the farmer, and all points discussed should be considered

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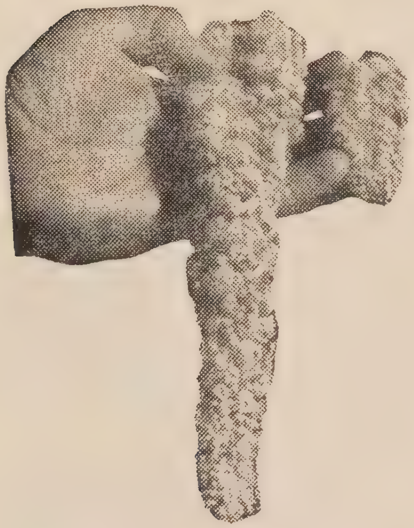

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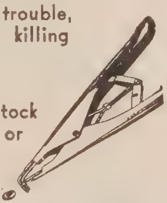

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on a relative basis and in terms of the degree of quality that is required for any given construction purpose.

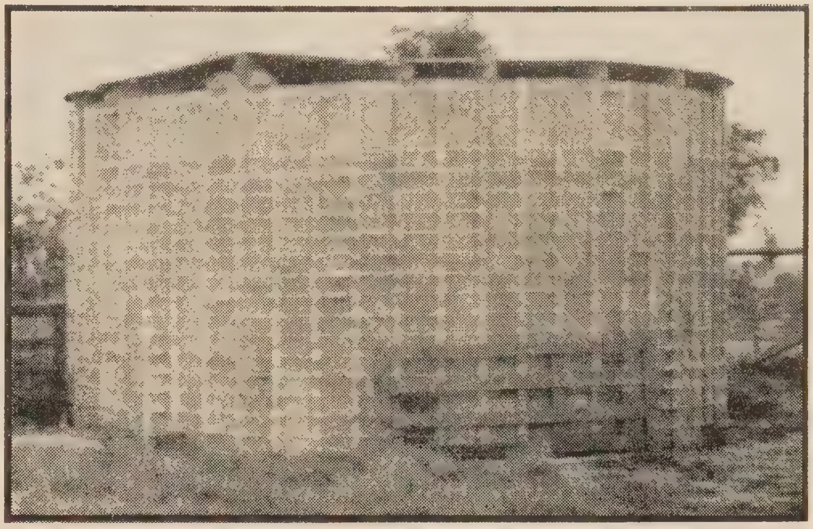
A concrete that is durable and otherwise satisfactory under conditions which give it protection from the elements might be wholly unsuitable in locations of severe exposure to disintegrating agencies. Watertightness is essential for a dam, but strength and rigidity are obviously the primary structural requisites for a building. The closest practical approach to perfection in every property of the concrete would result in poor economy under many conditions, and the most desirable structure is one which meets all reasonable requirements for serviceable life, safety, and appearance. If a structure is adequately designed and properly constructed of concrete which has sufficient strength to carry the design loads, it is economical not merely in first cost but in terms of its ultimate service.

Though the farmer can do many concreting jobs himself, much of the work in this field requires the knowledge and experience of experts to ensure its success, and the farmer contemplating the carrying out of any concrete work which he considers may be beyond his ability to do should have no hesitation in consulting an architect or a concrete engineer.

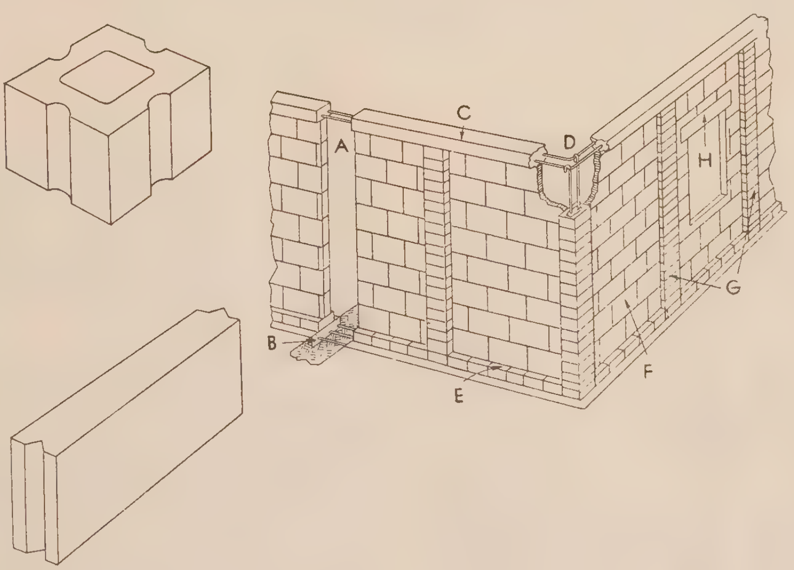
Proprietary Concrete Products

Several types of pre-cast concrete products are available from firms specialising in the production of concrete. Concrete fence posts, building blocks, field tiles, water troughs, segmental water tanks, culvert pipes, etc., can all be purchased at a reasonable cost. Some of these articles, such as fence posts, field tiles, and water troughs, are ready for use and require no further fabricating, but concrete building blocks and segments for tanks are arranged to suit any type of building and tank or trough construction.

The bottom illustration on page 233 shows a farm worker's cottage in course of construction in pre-cast concrete blocks, and the illustration above shows a water tank built from pre-cast concrete segments and tied with steel rods.



A water tank built from pre-cast concrete segments and tied with steel rods.



Method of building construction with concrete blocks. Upper left: Typical load-bearing block. Lower left: Typical breeze block. Right: Wall construction. A—Cut-away portion, showing reinforcing and footing. B—Reinforced-concrete footing. C—Continuous reinforced-concrete wall cap. D—Cut-away portion, showing reinforcing in the corner column of concrete-filled hollow blocks. E—Foundation blocks. F—Breeze-block filling between columns. G—Reinforced columns of concrete-filled hollow blocks. H—Reinforced-concrete window lintel.

The Slump Test

In the first article of this series reference was made to the slump test as a measure of the consistency of concrete batches. For this a cone-shaped mould measuring 4in. across the top and 8in. across the bottom, with handles on the side, and with foot pieces for holding it firmly is used. Test specimens are formed in the mould from samples representative of the batch, all pieces of aggregate larger than 1½in. being picked out and discarded.

The mould is filled with concrete, tamped, and the surface of the concrete struck off level with the top of the mould. The mould is removed by being lifted vertically in the same way as a child lifts an upturned bucket from a sandcastle. The slump is measured by determining the difference between the height of the mould and the average height of the top surface of the concrete after subsidence.

After the slump measurement is completed, tapping the side of the concrete frustrum gently with the tamping rod will give a valuable indication of the cohesiveness, workability, and placeability of the mix. A well-proportioned, workable mix will slump gradually to lower elevations and retain its original identity; a poor mix will crumble and fall apart.

This test is quite easily carried out and ensures uniformly good concrete throughout the work if it is conducted for each batch made.

Building with Pre-cast Blocks

In the third article in this series the use of different types of concrete blocks for different purposes in building construction, such as load-bearing and breeze blocks, was described. If the erection of any building or structure in pre-cast concrete materials is planned, the approval of the local building authority, where such authority is necessary, should be obtained before manufacture of the materials is begun, as varying by-laws may affect

USES OF CEMENT AND CONCRETE . . .

the requirements and dimensions of the materials. This step will ensure that all materials conform to local building requirements.

The method of construction when using two types of concrete blocks is shown in the bottom illustration on the preceding page. The foundation is excavated down to firm ground and a substantial reinforced footing is run. On this footing a course of load-bearing blocks is laid to act as a foundation for the breeze wall blocks. Columns are built from the load-bearing blocks at corners and at intervals between by filling up the hollows in the blocks with concrete, in which are placed one or two reinforcing rods. These rods should be hooked round the footing reinforcing and carried right through and attached to reinforcing in the continuous top cap.

After the columns have been built and before the top cap is run the spaces between the columns are filled with breeze blocks to the finished height of the columns and the top cap is then run right round the periphery of the building. The roof can be trussed and supported directly on the outer walls, with the trusses resting on the columns, or some weight may be carried on an internal partition wall, provided it is built to carry the weight.

Though there is no standard method of building in concrete, as with any structure, the strength and rigidity depend on design and the aim should always be to achieve the most satisfactory results with the maximum economy.

Recent Developments in Concreting

Normally concrete for roads, floors, pavements, and general structural work is made by mixing coarse graded aggregate, sand, cement, and water all together in a concrete mixer and then transporting and placing the plastic mixture wherever it may be required as the final hardened product.

Though this series of articles has dealt with this method of concrete production only, scientific research has made possible other methods of producing the final material.

By adding a chemical "wetting" agent to a cement, sand, and water grout, the fluid properties of the grout are increased to the extent that, although viscous, it will flow readily into all voids, completely filling them. Good concrete can be made by omitting the large aggregate from the concrete mixing process and depositing it in its final position in a natural state; the fluid grout is then poured over it to flow through it and completely fill all voids.

A grout made by mixing only sand, cement, and water without the addition of a "wetting" agent will not successfully penetrate and fill all the voids, with the result that the concrete will be honeycombed and weak.

The advantages of this method of producing concrete are apparent, particularly for the paving of yards, roads, floors, etc., as any coarse aggregate may be used, some of which may not be suitable for concrete mixed by normal methods, such as coarse crushed brick or ungraded reject stones.

Whatever the nature of the coarse aggregate, a dense impervious concrete is produced with a low ratio of cement to aggregate. Although for normal work the grout may have a cement-sand ratio of 1:1½ or 1:1¼, the final cement content will be considerably less than in a normal 1:2:4 mix, thus effecting a marked saving in cement.

The quantity of the "wetting" agent used is based on the amount of cement used and is added to the grout mixing water. The quantity has a constant relationship to the quantity of cement irrespective of the proportions of sand and water present, and although the grout is fluid (about the consistency of cream) the mix is stabilised so that there is no separation of the ingredients.

This method of concreting is also applicable to form work. The forms can be built and filled with coarse aggregate placed round perforated tubes down which the grout is poured, the tubes being either withdrawn or left in place.

Proprietary "wetting" agents for this method of concreting are available.

Acknowledgments

Acknowledgment is made for the use of material from the following publications in the preparation of these articles:—

"Concrete Manual," by the United States Department of the Interior.

"The Concrete Year Book," by Oscar Faber and H. L. Childe.

British Standard Specifications 340 and 556.

New Zealand Standard Specification 594.

"Mechanical Engineers' Handbook," by Lionel S. Marks.

DAIRY PRODUCE GRADED FOR EXPORT

THE following figures showing quantities of dairy produce graded for export during January and for the 6 months ended January 31, 1950, with comparative figures for the same month and 6-monthly period of last year, have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:—

BUTTER—

		Tons			Tons
Period	Creamery	Whey	Total	Percentage Inc. or dec.	Total in store at end of mth.
January, 1950	18,696	378	19,074	—	45,214
January, 1949	18,301	323	18,624	—	28,492
Increase or decrease	+395	+55	+450	+ 2.416	+16,722
For 6 months ended 31/1/50	109,578	1,931	111,509	—	—
For 6 months ended 31/1/49	99,191	1,701	100,892	—	—
Increase or decrease	+10,387	+230	+10,617	+10.523	—

CHEESE—

		Tons			Tons
Period	White	Coloured	Total	Percentage Inc. or dec.	Total in store at end of mth.
January, 1950	10,748	2,899	13,647	—	26,877
January, 1949	11,005	913	11,918	—	24,997
Increase or decrease	—257	+1,986	+1,729	+14.507	+1,880
For 6 months ended 31/1/50	50,554	14,205	64,759	—	—
For 6 months ended 31/1/49	56,856	2,641	59,497	—	—
Increase or decrease	—6,302	+11,564	+5,262	+8.844	—

If these figures are converted into butterfat equivalent, there is an increase of 10.114 per cent. in butterfat graded for the 6 months as compared with the corresponding period of the preceding season. It should be noted that the above figures refer only to butter and cheese graded for export, and that owing to diversions which may take place from time to time, they are not necessarily a true indication of production trends.

Pig Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in April as follows:—

Auckland—1YA, on April 18, at 12.35 p.m., "The Selection of Breeding Stock" (a discussion conducted by H. E. Clark, Supervisor, Auckland District Pig Council).

Hamilton—1XH, on April 4, at 7.30 p.m., "Aim for Better Housing," by S. A. Morgan, Supervisor, Waikato District Pig Council.

Napier—2YZ, on April 12, at 7 p.m., "The Carcass Quality Scheme and How it Works," by H. T. Donaldson, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on April 21, at 7 p.m., "You can Afford to Use Meal," by L. L. Marsdon, Supervisor, Wellington District Pig Council.

Dunedin and Invercargill—4YA and 4YZ, on April 12, at 7.10 p.m., "Feeding Pigs in Winter on Home-grown Crop," by N. Macdonald, Supervisor, Otago and Southland District Pig Council.

A Compact Honey Heater and Clarifier

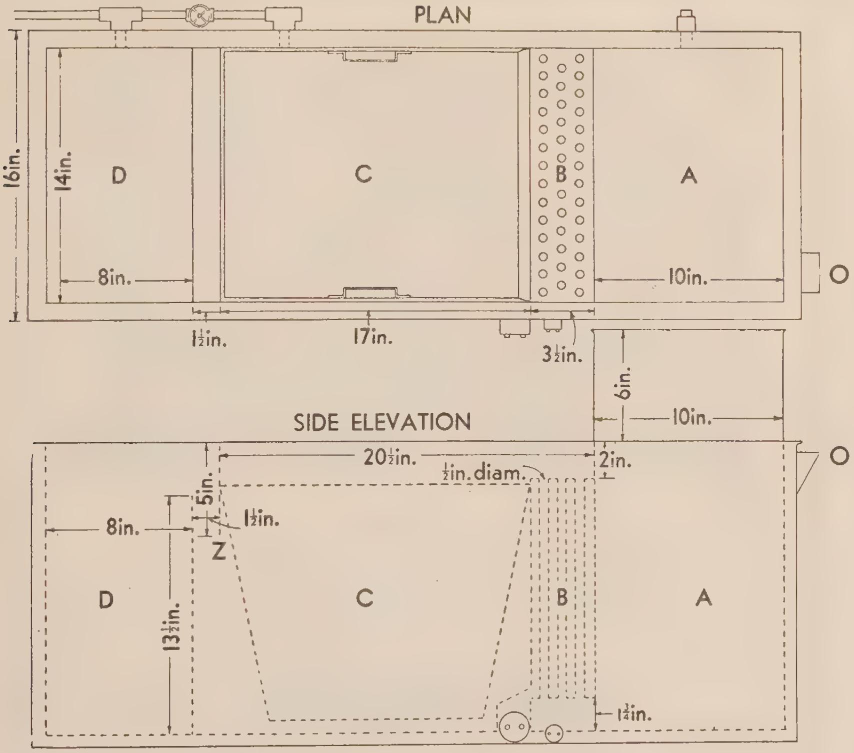
BECAUSE of the sticky nature of honey, its thorough straining has always been a problem to the beekeeper. It is desirable for him to know that by warming the honey much more satisfactory results can be attained. Various types of heating appliances have been devised whereby the honey is first heated and then strained and the following is a description of a heater and strainer, designed by C. R. Paterson, Apiary Instructor, Department of Agriculture, Hamilton, which incorporates all these features in a compact unit.

Experimental model heater and clarifier, showing essential heater parts which have been adjusted to conform to large-scale honey extraction requirements.

THE honey heater and clarifier is a water-jacketed container divided into four compartments, each serving a specific purpose. Heat is applied by means of an electric element under thermostatic control. Reference to the plan and side elevation on this page will allow an explanation to be given of the part each compartment plays in the working of the unit.

Section A of the unit takes the honey as it comes direct from the extractor or from a honey pump. It will be noticed that the walls of compartment A are much higher than the rest of the unit. This is necessary because the level has to build up to give the honey pressure to force its way through the vertical, heated tubes. Extra height is also required to allow for the accumulation of comb particles. To facilitate the removal of this material a fairly coarse grid may be suspended in this section and, if drawn and cleared when necessary, will greatly assist in the removal of all the wax particles.

In passing through section B the honey acquires its greatest amount of heat. The section comprises three rows of tinned copper tubes surrounded by water which is kept hot by the electric element at the base of the tubes. There is a considerable heating surface in these tubes and they have to be capable of bringing the temperature of the honey to a point where maximum straining can be attained. It will be seen then that, as long as there is pressure of honey in container A, honey will be forced up the heated tubes. Movement in the tubes will cease as soon as the level in A reaches the top level of the tubes in B. It is therefore desirable to keep a regular flow of honey coming into the unit all the time. A sudden surge of honey into A will cause honey to be forced up the tubes before it has had time to warm sufficiently.



Plan and side elevation of honey heater and clarifier.

Compartment C is kept as large as possible to allow of the greatest possible straining surface. The brass gauze basket is completely immersed in the warmed honey and the outlet for the strained honey is around the sides below the baffle plate Z. The strainer works on the simple principle that while the fine particles of wax, etc., readily rise to the surface in the heated honey, the clarified honey is moving away from below into compartment D. During the preliminary trials it was found that the gauze strainer required to be slightly tapered toward the bottom; otherwise the pressure of honey was inclined to press the gauze against the compartment walls. This considerably reduced the capacity of the strainer.

The baffle plate Z serves to keep the wax particles at the top of the honey while at the same time allowing a movement of honey from below. The depth of this plate has a bearing on the efficiency of the strainer. If it goes too far down, there is a tendency for fine particles of wax to be drawn down, gradually blocking the strainer.

Compartment D is simply a reservoir for the clarified honey and gives the automatic pumping unit an opportunity to cut in and out as required.

At the end of a day's extraction the honey in compartment C can be removed by opening the stop valve, when the pump will take it away to the tanks. As the honey in A is unstrained, it cannot be dealt with in this manner. If extracting is to be carried on for

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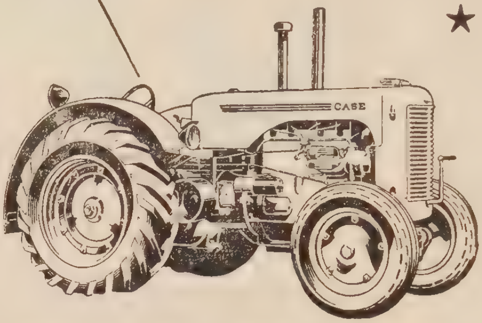

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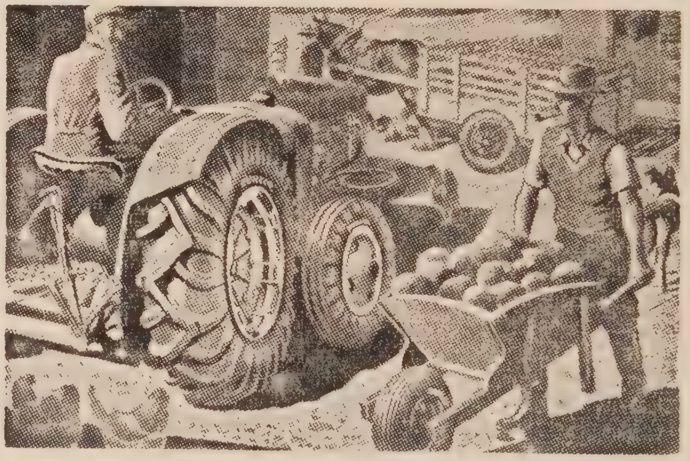

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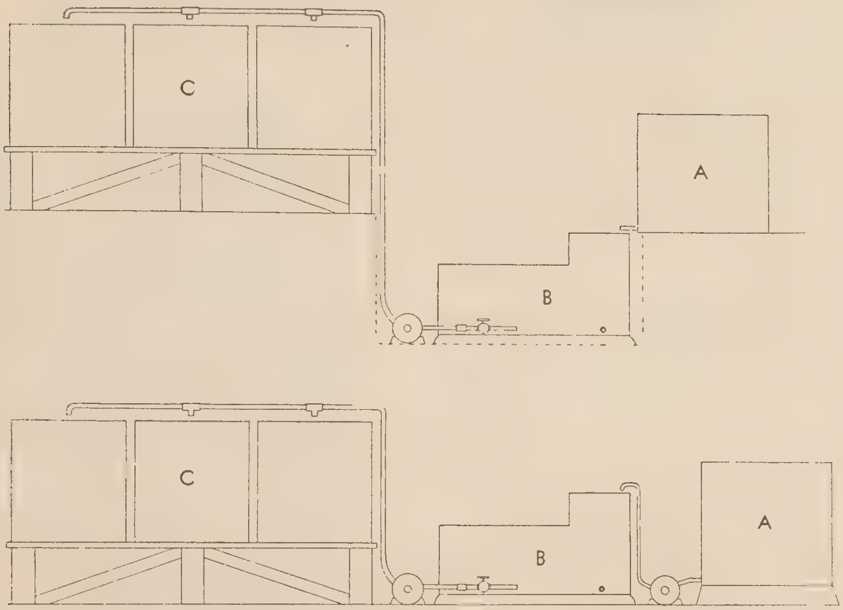
HONEY HEATER AND CLARIFIER



Upper—Heater and strainer (B) placed below floor level and extractor (A); a pump is used to lift honey to the tanks (C). Lower—A better set-up, where all equipment is based on floor level. One pump lifts the honey from the extractor (A) to the heater and strainer (B), while the automatically controlled pump delivers the strained honey into the tanks (C).

several days, it is best to skim the surface heavily and then leave this honey to start with next day, making sure the heater is switched off and the unit covered over for the night.

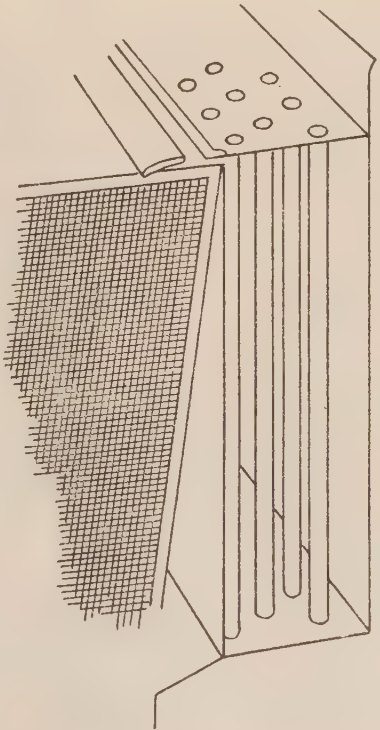
Construction

Expert workmanship is required in the construction of the heater and strainer, as it is very necessary to have all joints thoroughly soldered; otherwise water may leak away into the honey with serious results to both honey and unit. The water level can be checked by occasionally looking in at the filler opening O in the side elevation drawing on the previous page.

Tinned copper is used for the inside walls of the container, but plain copper will do for the outside container; approximately ¾in. is allowed for the water jacket. The bottom of the inside container is made so that there is a slope toward the outlet in each compartment. To maintain an even water jacket and prevent bulging in or out of the sides it is necessary to adopt some means of keeping these walls rigid. This can be done by fixing a number of small angle strips on the inside of the two walls. A tradesman should know how to do this. Do not use bolts as separators for the two walls, as they are liable to work loose in time, with the possibility of water leakage.

The tube unit B is generally assembled separately and then soldered into position on the inner container. The heating element, which needs to be of 2000-watt capacity, should be placed in such a position that the hot water rises directly round the tubes and then round the water jacket. The drawing will show how this has been done. The thermostat, which is of the usual hot-water type, should be near the element for convenience of wiring, but controlled by the temperature of the water in the bottom of the container.

The strainer in compartment C is constructed with a taper to the bottom on all sides. If this is not done, it will be found that the sides of the strainer will bulge outward and come into contact with the sides, thus considerably reducing the efficiency of the strainer. The top of the strainer should fit neatly round the walls and the sketch below indicates how the honey is guided from the tubes over the strainer. Two small handles on the inside of the strainer facilitate its removal when cleaning is necessary. A spare strainer has been found desirable to reduce any delay when handling rather thick honey. The size of the mesh of the strainer gauze should be determined by the beekeeper himself, as he should know the type of honey being handled and the gauze most suitable for it.



Sketch showing how the honey is guided from the tubes over the strainer.

The connections to the honey pump are the usual pipe fittings. Milking-machine fittings are desirable, if obtainable. The stop valve between compartments C and D should be of a type that will give maximum clearance when opened.

Compartment D is used in conjunction with an automatically controlled honey pump as shown in the photograph. This pumping unit will be fully described in a subsequent article. The filler opening and leads to the honey pump and switches may be put in any handy place on the heater to suit individual honey-house requirements. The plan on page 237 shows the position of these fittings and dimensions of the improved heater made to suit the requirements of a large commercial beekeeper.

Working Statistics

In using this type of heater and strainer it is necessary to have the temperature of the water well up before commencing to extract honey. The thermostat can be set for 140 degrees F., but adjustments may be desirable after a trial run. The initial temperature of the honey has a bearing on the setting of this control. If honey is put through too soon, it will be found that the element is unable to catch up on the temperature. This is governed, of course, to a large extent by the temperature of the honey as it comes from the extractor. The following are records of temperature taken last season from a honey house situated in the King Country, when this type of strainer was used for the first time:—

	Degrees F.
Honey in the comb as it came in from the out apiaries	55
Honey placed in a warming room; temperature when extracting commenced	82
Honey as it came up through tubes in compartment B	134
Honey as it came through pump ..	112
Top temperature in honey tank (1 ton) when full	106

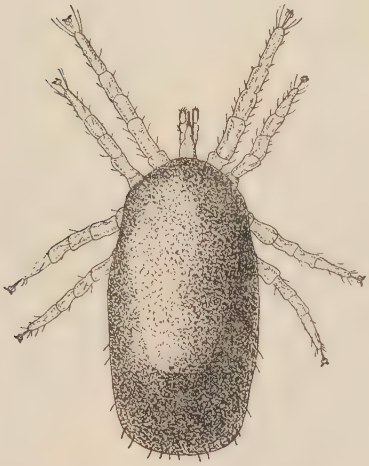
The strainer was skimmed during working and a considerable amount of scum was collected. It was found that only a very light skimming was required after the honey had settled in the tanks. The strainer may go the whole day without need of cleaning, but a change of strainer at midday ensures an uninterrupted run in the afternoon.

This heater and strainer has been devised to give the beekeeper a compact, efficient unit, but it must be remembered that regular cleaning of the strainer is necessary. The period between cleaning will depend on the type of honey being handled, temperatures, and rate of extraction.

* * *

Household Poultry: Reasons for Pullets not yet being in Lay

AT this time of year all pullets other than those which were hatched late should either be laying or showing signs of doing so very shortly. Householders whose pullets are backward should seek the reasons for the immaturity and a little thought on the subject should supply the explanation. In this month's article for the household poultry keeper W. L. McIver, Poultry Instructor, Department of Agriculture, Hamilton, summarises reasons for backwardness in pullets.



[After U.S. Department of Agriculture Bulletin, reproduced in "Diseases of Poultry," Collegiate Press, Iowa, U.S.A.

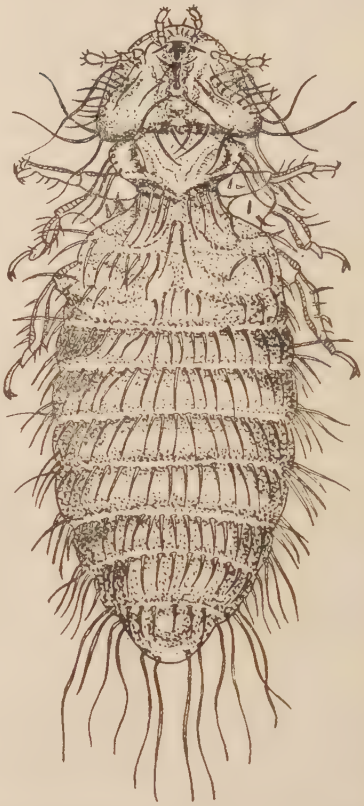
A female red mite, greatly engorged with blood after feeding.

A WELL-RECOGNISED principle of poultry keeping is that the most profitable pullet is one that begins to lay earlier than the average bird and does not stop until later than the average. Reasons for backwardness which cannot be rectified now but which can be obviated next season are:—

1—Chickens hatched after September.
2—Faulty brooder management.
3—Mismanagement during chickenhood.
4—Rickets during chickenhood.
5—Improper diet.
6—Overcrowding and sweating.
7—Pullorum and coccidiosis.
8—Sub-standard breeding stock.
9—Inadequate early culling.

Reasons which have been and are within the control of the owner are:—

10—The presence of colds.
11—Roundworm infestation.
12—Body lice.
13—Red mites.
14—Insufficient attention to accommodation, shade, and fresh runs.



[After Reis and Nobrega in "Diseases of Poultry," Collegiate Press, Iowa, U.S.A.

A male poultry louse.

If none of these reasons seems applicable there is a distinct possibility of maturity having been delayed by diseases which were caught early in life but are so slow in showing severe symptoms that the amateur does not recognise any ailment. Retaining such pullets until they finally die or come into very poor production at 8 to 9 months of age obviously is uneconomic.

Information about the control of worms, lice, and mites may be obtained from Bulletin No. 327, "Internal and External Parasites of Poultry," available free from any office of the Department of Agriculture.

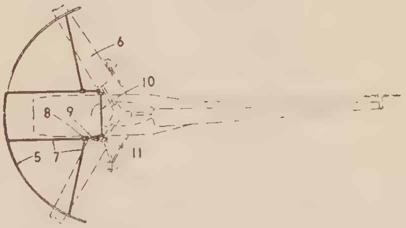
CHANGES OF ADDRESS OF "JOURNAL" SUBSCRIBERS

To ensure continuity of delivery of issues of "The New Zealand Journal of Agriculture," subscribers are required to give 4 weeks' notice of change of address. The old address and the new address, together with an address label clipped from a recent "Journal" envelope or wrapper, should be sent to the nearest office of the Department of Agriculture.

Recent Patent Specifications for Farming Inventions

The following particulars of recent patent applications of interest to farmers have been selected from the Patent Office Journal, December, 1949, issue and are published by permission of the Commissioner of Patents, Wellington. Photostat copies of any specifications will be supplied for a small fee on application to the Patent Office.

No.	Description.	Applicant.
95537	Aerial Spraying by Helicopter,	Pest Control Ltd.



To effect a better coverage of crops dusted or sprayed from a helicopter and in particular to use the upwardly directed air movement, created by the reflected downwash, for treating the underside of plants, the liquid or dust to be sprayed is introduced into the forward part of the downwash of at least one rotor. An arcuate spray-bar 5 is consequently disposed below the forward part of a rotor 6, being carried by a spray boom comprising arm 7 secured to spindles 9. A pump or compressor, dosage regulator, flexible tubing, and nozzles are part of the equipment. Alternative arrangements are envisaged for other types of helicopters.

No.	Description.	Applicant.
95020	Process for Promoting Plant Growth,	Dell Alvos.
95762	Wool-blending Machine,	J. D. Townsend.
95773	Process for Treating Wool-scour Water with Calcium Hypochlorite,	Fields Point Manufacturing Corporation.
96310	Shield for Fertiliser Distributor,	G. O. Hoffstetter.
92207	Manufacture of Insecticidal Preparation,	V. H. Chambers.
92289/90	Spraying Poisonous Liquid for Vegetation,	R. C. S. M. Rasmussen.
92620	Pest Control Composition,	California Spray-Chemical Corporation.
94617	Shield for Tractor Power-take-off,	Ford Motors Co.

Advantages of Keeping an Orchard Diary

AN orchard diary is invaluable; in maintaining a well-run establishment it is essential. Records of all orchard practices can be set out briefly for handy reference, and once a grower starts keeping such records he will become aware of their value and the interest they can create. In this article R. I. June, Orchard Instructor, Department of Agriculture, Hastings, explains some of the uses an orchard diary can serve.

CLOSE observation leads to success in maintaining an orchard to the best advantage, but it is unsatisfactory to try to retain observations by memory. By keeping a diary a grower can record them for reference and this gives him a sense of confidence, as he has previous experiences on which to rely. He can prosper by his mistakes if he can trace them to their origin.

Habit Soon Formed

Many growers consider they have not the time to keep a diary up to date, or they forget it for days at a time. If entries are made at the same time each day, the habit is soon formed. It is very important to keep entries up to date, as observations or operations carried out a day or two previously are often difficult to recall. The longer a diary is kept the more interesting and valuable it becomes. Comparisons can be made on previous years' entries and records of experiences are there for use at any future date. The interest created by a diary makes the few minutes a day spent on entries seem negligible. Perhaps the best time for making entries is in the evening, either before retiring or after the evening meal.

Types of Diaries

Many types of diaries are available which are headed according to the use for which they are required; some are ruled to include accounts and there are special diaries for farmers.

A strong book with lined paper is all that is necessary if the diary is not to include accounts. Each page can be divided to cover a 4- or 5-year period with the same date for each year on one page for handy reference. A glance back over the previous year's entries of the same date often recalls some item of interest or importance, which adds to the value of a diary.

What to Record

An orchard diary can be kept to suit the individual requirements of the grower, and it is for him to decide just how complete it is to be. Weather observations, details of all spraying operations, and dates of thinning, cultivating, harvesting, and pruning are most important and should be included.

During a recent cost-of-production survey of pip fruit it was found that well-kept diaries were of great assistance in compiling accurate data.

An accurate record of spraying operations is perhaps one of the most important items. In fact, some orchardists confine their diaries to this subject alone, to good advantage. The entry should be headed with a brief reference to weather conditions at the time, as this is often useful where foliage damage or fruit russeting (which may be due to adverse weather at the time of application) develops. It is very satisfying to be able to trace such troubles.

The spray mixture, starting and finishing times, amount of spray used, efficiency of the pump, and similar items can be noted, brief entries being all that are needed. Long entries should be avoided, as they are more difficult to locate for reference.

The items which it is suggested should be noted in relation to spraying make it possible to ascertain what spraying operations cost and the amount of spray materials used, or the materials required for next season.

Recording Observations

As in many cases casual observation of diseases or pests comes too late for adequate control measures to be taken, making systematic and frequent observations is vital to good orchard practice. Results of these observations should be recorded.

A close watch is necessary to detect signs of diseases such as black spot, mildew, rust, and shot hole and insect pests such as leaf hopper, aphis, and red mite. Diary entries relating to the pests and diseases mentioned remind a grower when to expect them the

[*News-photo Service photo.*

Records of cultivation are useful items to include in an orchard diary, and are important where cost records are required.

KEEPING AN ORCHARD DIARY

[*Rendall's Photo Service photo.*

An accurate record of spraying operations is perhaps one of the most important items to include in an orchard diary.

following year, though the time at which they appear may vary somewhat because of weather conditions. This type of information becomes more valuable as the years pass and in some instances sprays could be applied to greater effect if a particular pest could be anticipated to a certain extent.

Further points of value and interest as records are the blossoming stages of different varieties and thinning dates for each variety, with reference to fruit spacing and natural drop. These may have a bearing on the variety which should be thinned first in subsequent years.

Records of cultivation are useful and are important where costs are required; they may also indicate how moisture conservation and weed control can be improved.

Manure-application data are valuable—a grower may forget when he applied lime last or he may observe that certain manures or certain times of application give better results. Notes on cover crops can be included with the references to manures and cultivation.

Harvesting dates for each variety of fruit are always interesting and can be recorded briefly. Special reference can be made to colour, size, and general condition of fruit at picking time. Pruning dates and time spent on the operation, details of machinery purchase, maintenance costs, and, where it is practised, irrigation are all worth recording.

Growers may have other items they wish to enter and there is no reason why personal items cannot be included. It is surprising how often a personal diary is referred to as a matter of interest and sometimes to settle arguments. Records of trips or holidays away from the orchard should be entered to carry on the sequence of the diary, because if this is not done there may be gaps in the record which cannot be accounted for subsequently.

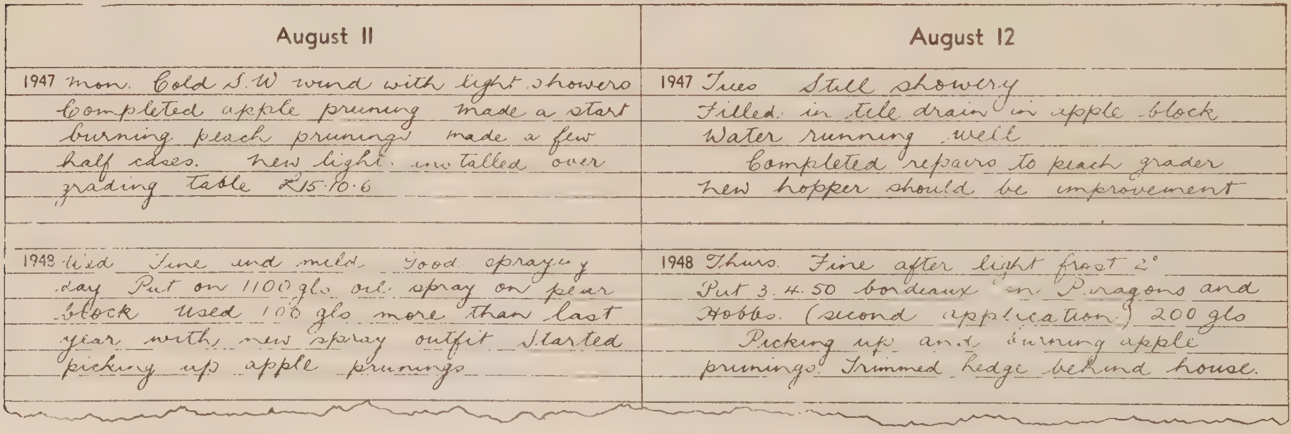
Orchard Plan

An orchard plan, though not part of a diary, is worth considering. The initial drawing may involve considerable time, but once it is done it is easily kept up to date.

The plan should be drawn to scale, showing tree distances, varieties, root stocks, whether trees are grafted or budded, etc. Hedges and shelter belts and fences and buildings should be included. Drains should be marked carefully, giving the type of drain and outlet position. These details are particularly valuable when new drains are to be added. Soil types can also be noted. Plans are valuable when information is required for orchard registration and statistics.

Where a replanting or replacing scheme is undertaken distances can be worked out accurately on paper if a plan exists, which saves a great deal of time. If the orchard is piped for spraying, positions of pipes and taps should be marked. This applies also to irrigation or other water pipes. On a large property divided into several blocks a plan facilitates the direction of staff.

To a new owner taking over a property an orchard plan would be a most valuable record, as, well drawn, it would show all detail at a glance—a clear history of the property which would serve many purposes during the life of the orchard.



August 11	August 12
1947 Mon. Cold S.W wind with light showers Completed apple pruning made a start burning peach prunings made a few half cases. New light installed over grading table £15.10.6	1947 Tues Still showery Filled in tile drain in apple block Water running well Completed repairs to peach grader New hopper should be improvement
1948 Wed Fine and mild. Good spraying day Put on 1100 gls oil spray on pear block Used 100 gls more than last year with new spray outfit Started picking up apple prunings	1948 Thurs. Fine after light frost 2° Put 3.4.50 bordeaux on Paragons and Hobbs. (second application) 200 gls Picking up and burning apple prunings. Trimmed hedge behind house.

Examples of the items which would be entered in an orchard diary. The illustration shows entries for 2 years in a 5-year diary. On the same page space is allotted for 1949, 1950, and 1951.

SEED PRODUCTION IN NEW ZEALAND

Seed Testing

By A. V. LITHGOW, Officer in Charge,
Department of Agriculture Seed-testing Station,
Palmerston North.

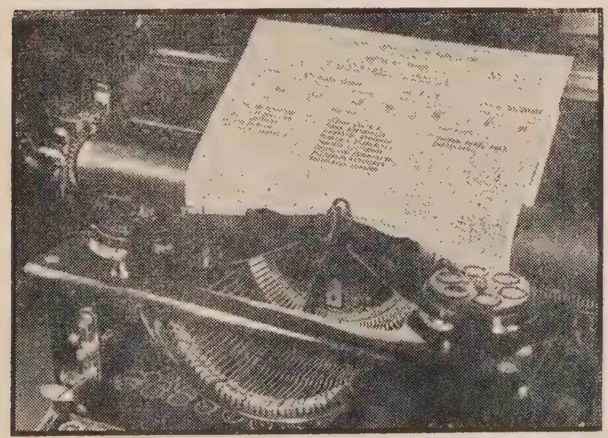
THE value of seed cannot be estimated from a cursory examination. Careful analysis is required to determine its purity, the types of impurity present, and the germinating capacity of the pure seed. The Department of Agriculture Seed-testing Station undertakes this inspection and provides the information on which the value of the seed can be based.

SOME 80 years ago the first seed-testing station was established in Saxony by Professor Nobbe. The value of the organisation was quickly realised, and by the turn of the century most European States had such stations and seed was also being tested in the United States of America. Now all progressive countries have seed-testing stations, both private and official. The keen buyer demands evidence that the seed he buys is good, tested by stations whose efficient service is his guarantee.

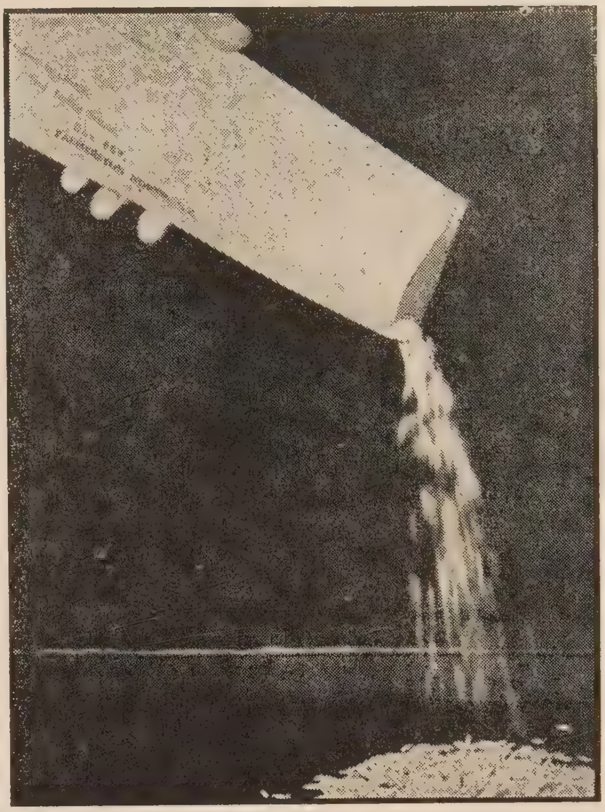
The New Zealand Service

The New Zealand Department of Agriculture was not slow to follow the example set overseas. Under the guidance of Mr. A. H. Cockayne, and later of Mr. E. B. Levy, the work in New Zealand developed until by 1918 a sound foundation of seed testing had been laid. In the following 30 years the demand for tested seed has expanded steadily. Without this service seed traders had to attempt to value seed by its appearance, and though they could form an approximate idea of its purity, the presence of undesirable weed seeds often passed unnoticed, and the germinating power of the seed was unknown. Merchants found that seeds supported by an independently-issued certificate were bought more readily by discriminating buyers and were in greater demand overseas. In addition, they found that they could buy more confidently if they knew the purity and germination of a line.

Since 1925 the New Zealand station has been a member of the International Seed Testing Association, which has aimed at bringing about a more uniform technique in testing. Before its work bore fruit a variety of methods used in different countries made interpretation and comparison of certificates no easy task. The methods recommended by the international association have been adopted in New Zealand, with the result that in overseas countries complete reliance can be placed on New Zealand certificates. That has been of great assistance to the export trade of the Dominion.



A certificate of analysis being prepared.



In 1910, when the station was situated in Wellington, the work was regarded as a part-time occupation for one man, and some 180 samples were tested for purity and germination. During the First World War it was transferred temporarily to Weraroa, and by 1918 the number of samples handled annually had risen to nearly 4000. In 1928 the station was transferred to Palmerston North; the staff had then increased to 10 and in that year more than 10,000 samples were examined. By 1947 a staff of more than 70 was responsible for the handling, testing, and reporting of some 49,000 samples.

In 1910 the work of the station was limited to purity and germination analyses. While most samples are still subjected to these tests, strains testing of perennial ryegrass by ultra-violet light and of white clover by the picric acid test is also undertaken now. Other services include moisture testing and the pre-harvest examination of ryegrass for blind seed disease. In addition to the routine activities of the station, considerable investigation work is also carried out. Research is undertaken into problems associated with seed quality and technique of seed testing, and no effort is spared to ensure that the New Zealand station is conversant with overseas findings in this field. Examples of research undertaken by the station which have been of direct benefit to the farming community include investigations into the application of the ultra-violet light test to perennial ryegrass seed and of the picric acid test to white clover seed and into blind seed disease of the ryegrass species.

Another part of the station's work is the buying of seeds for all Government Departments. With the test results of every worthwhile line of seed at its disposal, no organisation is better placed to buy seed at its true worth. When land development is undertaken, the Department concerned knows that its seed purchases have been made to the best advantage and that the quality will contribute to the success of the venture. In some years more than £100,000 worth of seed has been bought for land development through the Purchasing Officer for Seeds.

THE WORK OF THE SEED-TESTING STATION

Above—A seed sample being analysed for purity. Right—Seeds in process of germination. In oval—Seeds being counted out for testing.

Above—Ryegrass seedlings undergoing the ultra-violet light test for determination of type. Right—White clover seedlings being germinated preparatory to the application of the picric acid strain test.

THE WORK OF THE SEED-TESTING STATION

Portion of the seed-testing laboratory. All routine laboratory duties are carried out by young women, who find the work full of interest. Staff is usually recruited from girls of school-leaving age with education at least up to School Certificate standard.

Standards of Quality

The quality of seed is defined by three factors—its purity, its germination, and its strain.

Purity

Good seed is of high purity—in other words, it does not contain large quantities of unwanted or possibly-harmful weed seeds which, if sown, might ruin the resultant crop. Practically all samples contain some weed seeds, and the buyer must decide whether those in the line offered are likely to be a menace in the conditions under which the seed will be sown. Other crop seeds are usually viewed with tolerance, but an exception is perennial ryegrass seed as an impurity in cocksfoot seed intended to be sown for further seed production; if appreciable proportions are present, the ryegrass tends to dominate the cocksfoot in a seedling stand. Inert matter, though harmless, is valueless, and unduly-large amounts of broken seed, dirt, and chaffy material can affect adversely the true value of the seed.

A purity analysis is made by inspection. When a sample from a line of seed is submitted for examination, a small working sample is taken in such a way as to be representative of the seed submitted. From this sample are separated all other crop seeds, weed seeds, and inert matter, and their description is recorded. All these separations are weighed carefully on a precision balance, and the pure seed content is calculated as a percentage of the sum of all the separations. Thus, a purity of 98 per cent. means that in every 100lb. of the line 98lb. is pure seed.

The certificate issued by the Seed-testing Station records the percentages of each separation present in the sample, and also lists, in approximate order of the amount present, the botanical names of the weed seed and other crop seed impurities observed during the analysis. Botanical rather than common plant names are used on certificates to avoid the confusion which exists in common plant names. Many examples could be quoted of the same common name being applied to widely-different species and, conversely, of the one plant being known in different districts by different common names. The botanical name is also essential in the case of sales overseas, where the divergence in application of common names is even greater.

Germination

Pure seed has no value unless it will grow and produce healthy, mature plants. In testing for germination it is not possible to grow the seed to maturity under field conditions and estimate the percentage of plants produced. Under laboratory testing some 400 pure seeds are placed on damp, absorbent paper in a germinator cabinet at the most suitable temperature for rapid germination. After a number of days, fixed for each variety under test, the tests are examined and seedlings which, to the trained eye of the analyst, appear capable of continued growth are counted and removed. Later the seeds are again inspected, and any further healthy seedlings removed. The length of time between counts varies with the species. At least 2 counts are always made, and sometimes as many as 4 are necessary. However, only 2 are reported—an early or interim count, and a final count at the conclusion of the test. The interim report gives the speed of germination and is an indication of the seed's vitality; the final count defines the total percentage of viable seed.

NUMBERS OF TESTS CARRIED OUT

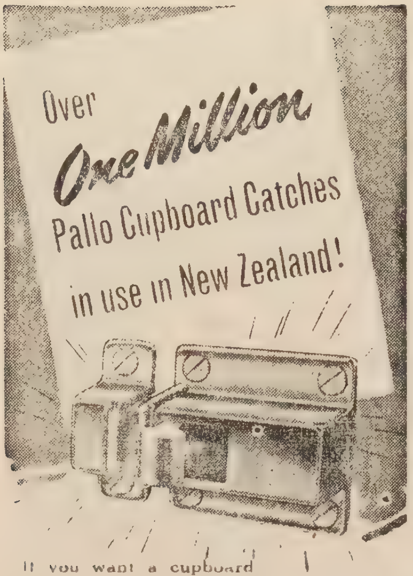
Year	Purity and germination	Year	Purity and germination
1910	180	1916	3,200
1911	400	1917	2,700
1912	400	1918	3,859
1913	650	1919	6,261
1914	1,863	1920	8,165
1915	2,646	1921	8,800

Year	Purity analyses	Germination	Ultra-violet light	Picric acid
1922	1,500	9,056		
1923	1,526	9,100		
1924	1,236	8,266		
1925	1,242	8,146		
1926	1,896	8,516		
1927	3,127	10,509		
1928	2,594	10,060		
1929	3,190	9,054		
1930	4,022	10,328		
1931	4,575	10,669	886	
1932	6,241	11,740	1,895	
1933	9,181	15,056	1,824	
1934	8,140	13,306	1,361	
1935	8,651	15,309	1,525	
1936	10,824	15,650	2,026	
1937	11,098	17,734	1,537	1,699
1938	10,840	17,540	1,990	1,425
1939	15,642	21,731	2,470	1,949
1940	15,845	20,392	2,798	1,792
1941	19,934	23,829	3,756	3,119
1942	17,469	21,793	3,106	2,954
1943	20,079	23,964	2,201	3,628
1944	22,350	26,960	4,675	3,455
1945	29,366	35,011	4,150	4,780
1946	33,732	40,000	5,190	7,258
1947	35,623	48,922	6,087	6,308

During the past 5 years the demand for seed-testing services mounted rapidly as seed production expanded under the stimulus of high prices in overseas markets.

When the results of a germination test are reported certain additional information is given. Hard seeds are found in varying quantities in legumes. These seeds are normal in that they are alive, but they have a very tough seed coat, and germination is delayed until water can penetrate it. Unless present in very large numbers, they are usually regarded as normally-germinating seeds, as after a comparatively-short period in the soil most of them will grow.

In the laboratory a seedling is regarded as normal if it produces those parts essential for its continued growth and the production of a mature plant. Sometimes the seedling will produce a root which shows distinct fractures or a sprout without any seed leaves. Such damage is usually caused by mechanical injury to the embryo within the seed. These seedlings would never reach a healthy maturity and are classified as abnormal growths. As a general rule samples show comparatively few of these abnormals, but under certain conditions a very large increase in the proportion of abnormal growths may result. Legumes are the worst offenders in this respect, and on occasions lupin seed has been so damaged as to produce far more



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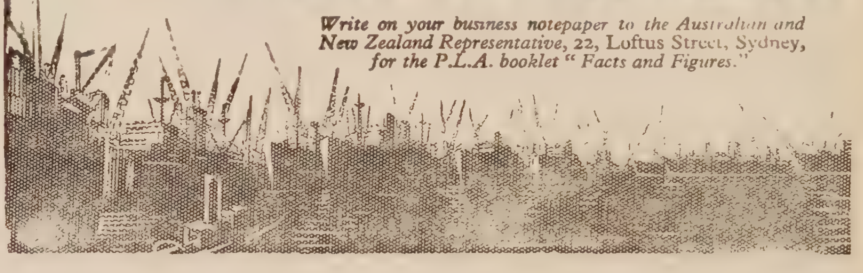

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abnormal than normal seedlings. Red clovers usually show far more abnormals under germination test than do white clovers. If the proportion of broken or damaged seed in a sample is high, it can be assumed that abnormals will also be found among the germinating seedlings.

By considering the results of both the purity and the germination analyses together, the purchaser can estimate what percentage of the seed he buys is pure living seed, and thus arrive at an estimate of its true worth. If the analysis shows a purity of 98 per cent., then 98lb. in every 100 is pure seed. If this pure seed has a germination of 90 per cent., then 90 per cent. of the 98lb., or 88.2lb. in every 100lb. of the seed (88.2 per cent.), is pure living seed.

The value of seed cannot be estimated from either purity or germination alone. Two lines may have the same purity—say, 98 per cent.—but the germination of the first may be 90 per cent. and of the second 60 per cent. A comparison of value is then 90 per cent. of 98 to 60 per cent. of 98, or 88.2 to 58.8.

The percentages of seeds germinating at the interim and the final stages of counting are recorded on the certificate, with the percentages of hard seeds and abnormal growths. The calculated percentage of pure living seed in the sample completes the information supplied.

All seed certified under the New Zealand Department of Agriculture's certification scheme is sampled independently by departmental officers and tested for purity and germination at the Seed-testing Station.

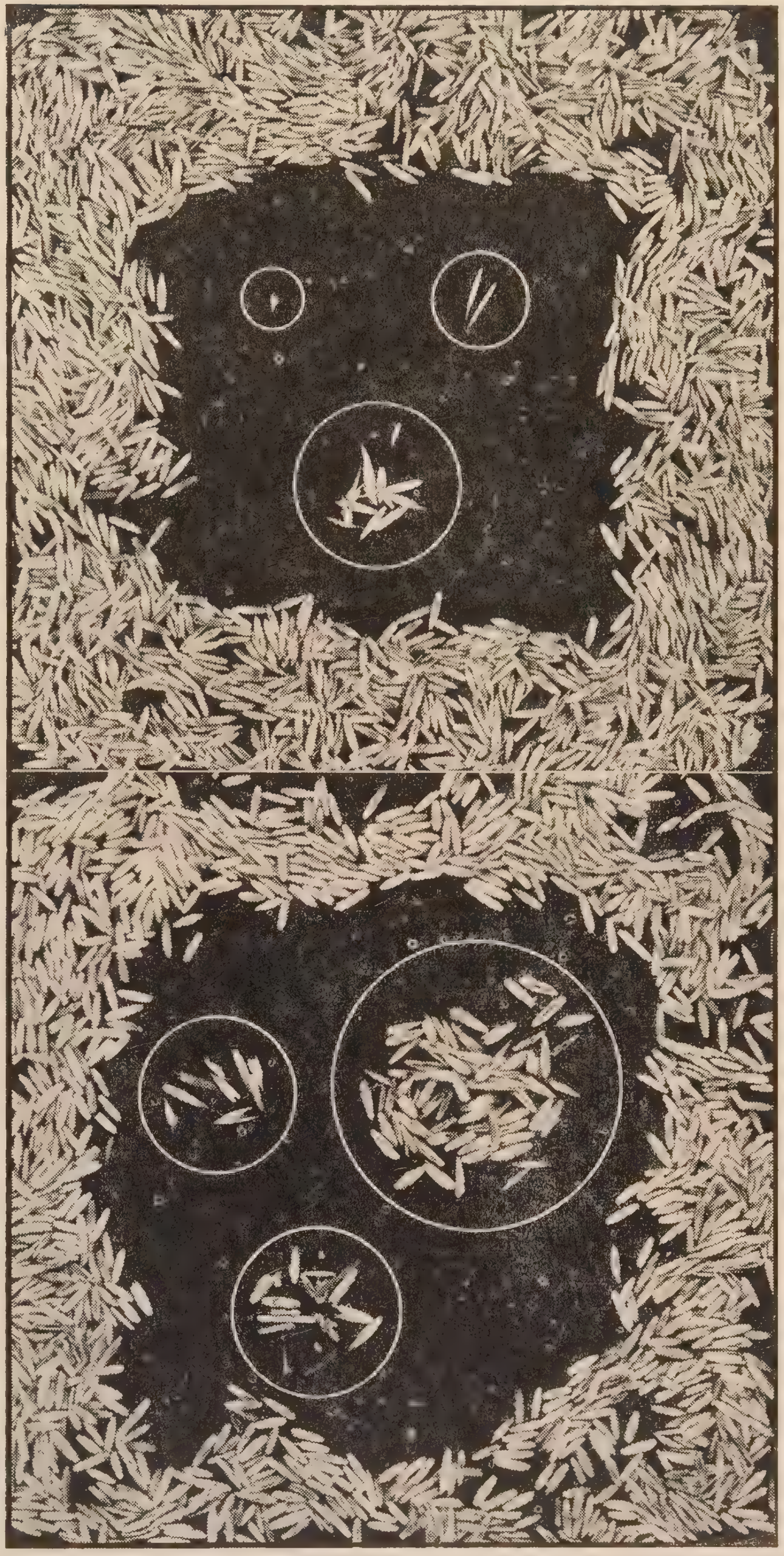
Strains

Much seed is tested for strain or type by plot testing. This involves the growing of the seed under field conditions, observing it during its growing period, and classifying it in accordance with the results of these inspections. The Seed-testing Station is unable to undertake such work, but it has developed laboratory tests for the identification of strain in 2 of New Zealand's most important species, perennial ryegrass and white clover, and carries out routine tests of this nature in association with the certification scheme.

For identifying the seed of true perennial ryegrass the ultra-violet light test is used. The seed is grown on moist filter paper and observed under a screened mercury-vapour lamp. Short-lived strains produce on the paper a substance which glows under the ultra-violet light rays; true perennial ryegrass does not do this.

The other laboratory test, the picric acid test for white clover, depends on the fact that the better strains of white clover contain greater quantities of certain glucosides than do the poorer strains. These glucosides break down when the plant tissue is crushed,

IMPURITIES IN PERENNIAL RYEGRASS SEED SAMPLES



RIGHT: The impurities in perennial ryegrass samples with a purity of 99.8 per cent. (upper) and 92.6 per cent. (lower). In each illustration the upper left circle surrounds the other crop seeds present, the upper right circle the weed seeds, and the lower circle the inert matter.

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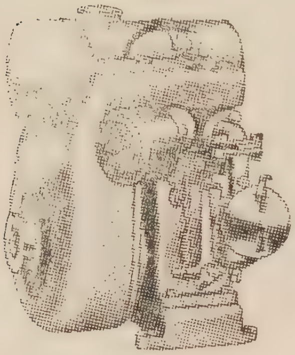

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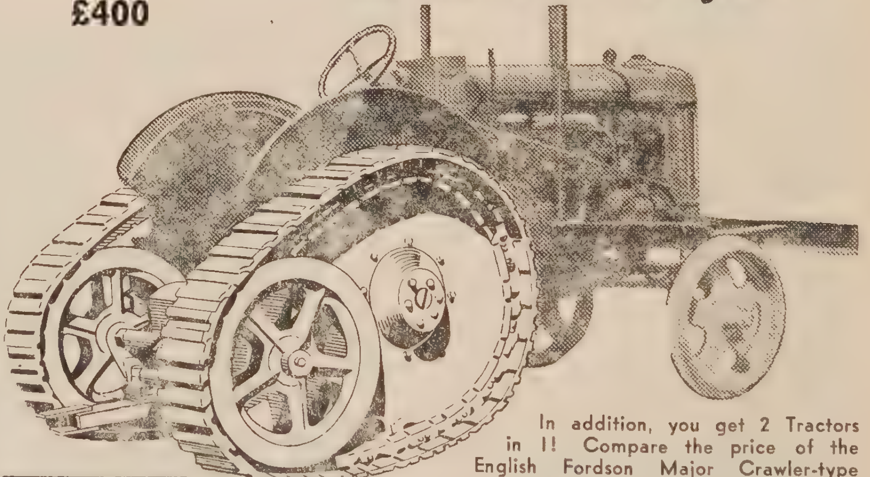

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liberating small quantities of hydrocyanic acid gas. This gas can be detected when it comes in contact with paper which has been soaked in picric acid. Normally the paper is bright yellow, but contact with hydrocyanic acid causes it to turn brown. Thus, with pure lines of the best strains of seed the paper turns a dark reddish brown, while with the poorest strains there is little or no change in the colour of the paper. By using these methods the standard of the strain can be assessed in about 10 days instead of the many months necessary when the plot test method is used.

Moisture Tests

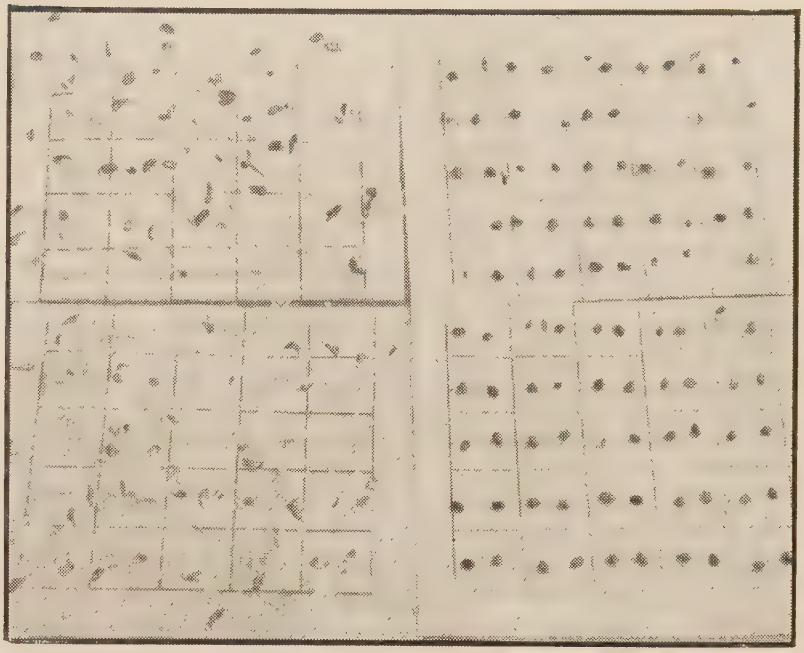
When seed is to be shipped or stored it is desirable that its moisture content be known. If the seed contains too much moisture, it will deteriorate very rapidly and germinate unsatisfactorily on arrival at its destination.

Chewings fescue, crested dogstail, peas, wheat, and barley are the principal seeds submitted for testing of moisture content. In addition, the station acts for the Wheat Research Institute and carries out pre-harvest moisture tests on wheat samples from growers in the North Island districts.

Blind Seed Disease in Ryegrass

During December and January each year sub-stations are established at the offices of the Department of Agriculture in Christchurch and Timaru for the pre-harvest examination of ryegrass for blind seed disease. Samples taken from crops before they are harvested are examined and the degree of infestation by blind seed disease estimated.

This service enables the grower to spare himself the labour and expense of harvesting crops which have been so seriously damaged by the disease that they are capable of producing only seed of low germination.



Red clover seeds of high (left) and low (right) germination. Before germination these samples were very similar in appearance.

Service for Farmers

A free advisory service is provided for farmers desiring information on any particular line of seed, and is availed of mostly in respect of seed for which purity and germination certificates are not available. A sample of this nature forwarded to the Seed-testing Station is reported on in letter form, as the information so supplied is regarded as only advisory and not as a basis for trading.

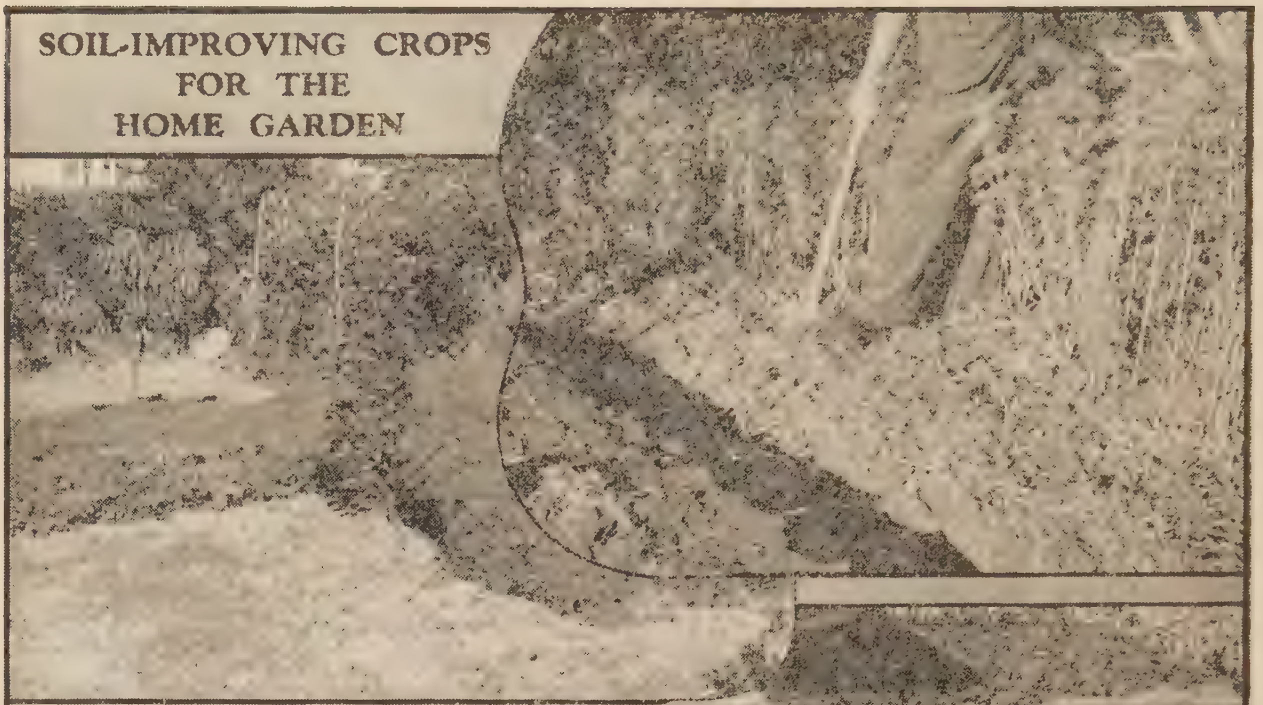
Seeds are germinated in specially-designed cabinets.

Service for Merchants

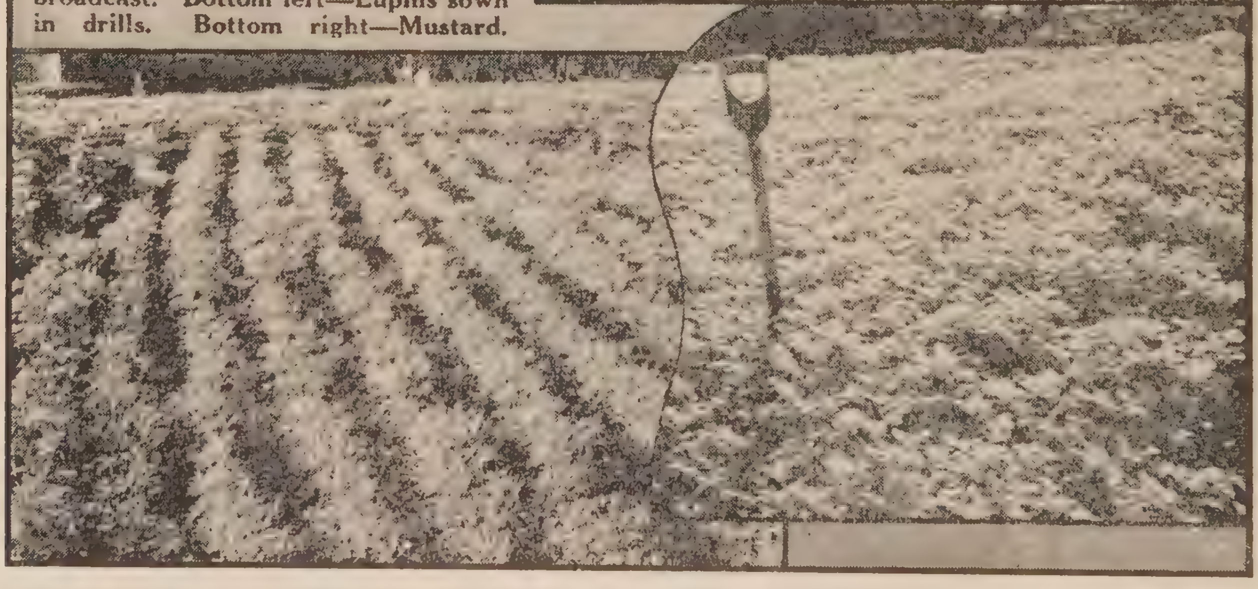
The major service provided for merchants is the testing of samples to provide certificates which serve as a basis for trading both within New Zealand and overseas. Demands for internal trading are usually satisfied by the ordinary purity and germination certificates, but the export trade often requires more detailed tests. Special searches may be made to ensure that the samples submitted are free from dodder; seed for export to Australia must comply with the Australian Quarantine Act; for the Canadian buyer all lines must be covered by certificates which record the grade of seed in accordance with the regulations of that country; the United States of America lays down certain conditions with which seed must comply before it can be imported. Tests for all these purposes are carried out and certificates issued.

Each week during the year about 1000 samples come to the station for test, and they include seeds of all kinds—flowers, vegetables, trees, cereals, clovers, and grasses. With a growing conception of the variation in value between different lines, pride of place must go to the better seed. These values can be determined only by accurate testing, and the certificates covering these tests must enjoy the confidence of merchants not only in New Zealand but also overseas. The value to the seed trade of a service such as that given by the Seed-testing Station is indisputable.

SOIL-IMPROVING CROPS FOR THE HOME GARDEN



Mustard and lupins are the two most-favoured green crops and if sown now will be ready to incorporate in the soil in early spring. Both will help build up the humus content of the soil, and lupin, being a legume, will also increase the nitrogen supply if left until the flowering stage. Both lupin and mustard can be sown broadcast or in drills. Seed should not be deeply dug in, but should be just covered with soil. Upper left—Lupin plants just through the ground. Upper right—Digging in lupins. Middle right—Lupin crop which was sown broadcast. Bottom left—Lupins sown in drills. Bottom right—Mustard.



[All photographs by Sparrow Industrial Pictures Ltd.

THE HOME GARDEN IN APRIL

By S. O. GILLARD, Vegetable Instructor, Department of Agriculture, Auckland.

ALTHOUGH during April day temperatures are fairly high, the nights are cool and the growth of plants is no longer vigorous. Steady growth can still be expected of hardy kinds such as leeks, lettuce, peas, and plants of the brassica family. Seed sowing will be restricted to those localities where the soil is well drained and the growing period extends well into the winter, and the vegetables which can be sown will consist of the more hardy kinds such as lettuce, onions, radish, spinach, carrots, turnips, beetroot, and broad beans. In most districts conditions are more favourable for planting than sowing, and plants of lettuce, cabbage, cauliflower, brussels sprouts, and silver beet may be set out. For crops which are to grow through the winter sowings or plantings are best made on ridges or raised beds, as this allows for better drainage and consequently higher soil temperature.

TO encourage growth and suppress weeds the hoe should be kept going, and any weeds growing between plants where they cannot be hoed out should be pulled or, if the ground is hard, cut out with a sharp knife.

Earlier-planted crops of cauliflower, broccoli, cabbage, and brussels sprouts should have the soil drawn up to them as they grow; this will help support the plants and prevent them from being blown about by strong winds; it will also promote better drainage during winter. Leeks should be kept earthed up, especially when nearing maturity, to blanch the stems, care being taken not to cover the heart leaves.

In districts which experience early frosts crops such as potatoes and kumaras should be dug and stored, and pumpkin, squash, marrow, and melon crops, which are also susceptible to frost damage, should be gathered. Tomato plants should be tied firmly to their supports so that they cannot become damaged by winds. To induce quicker maturity of the fruit the terminal shoot should be pinched out; subsequent growth of the first 3 side shoots below where the terminal has been removed should be allowed to grow unchecked and will protect the fruits against inclement weather and very light frosts. By this practice high-quality tomatoes can be obtained from the vines beneath this protective growth. Spraying the plants with Bordeaux mixture or with copper oxychloride to protect them from blight should not be neglected.

[*Sparrow Industrial Pictures Ltd. photo.*

Parsnips, which take a long time to grow to sizable roots, will keep quite well if left in the soil during winter. They may be dug for use as required.

[*Sparrow Industrial Pictures Ltd. photo*

The heavier garden waste should be burnt rather than composted

During April there is usually a considerable amount of refuse available for the compost heap and it will perhaps be best to start a new heap with all the fresh material rather than add it to a partially matured heap. Maturing heaps should be turned to hasten decomposition.

As soon as crops are harvested no time should be lost in clearing off the refuse and digging or forking the soil over. If the land is not required during the winter for a vegetable crop, it should be sown with a green crop, which will suppress weed growth and when full grown should be incorporated in the soil to build up the humus content; it will also make the soil more friable and easier to work in spring.

Mustard (agricultural) is a quick maturing green crop, taking about 12 to 14 weeks to attain a suitable size. Blue lupin, which is a favourite green crop with commercial growers, requires at least 20 weeks to reach the flowering stage. It is at this stage that the nitrogen nodules, which form on the roots of the plant, are usually largest and therefore the greatest benefit is derived if the plant is allowed to reach this stage before being incorporated in the soil.

In exposed positions lupins may be sown in drills at intervals throughout the garden with the rows running east and west to provide shelter for winter and spring crops.

Celery

Celery plants should be kept growing and an application of liquid manure will stimulate them. It is a good practice to begin blanching a few plants early so that the period over which good quality sticks can be harvested may be extended. If all the plants are blanched together, it may not be possible to use them all before the last become pithy and tough. Blanching may be done by drawing the earth up to the plants by placing boards 10 to 12in. wide on edge along each side of the bed or row, or by placing paper collars around each plant.

THE HOME GARDEN IN APRIL . . .

During late autumn and early winter celery plants are highly susceptible to attacks of leaf spot and should be kept sprayed with Bordeaux mixture or copper oxychloride. With successive plantings and regular spraying celery may be available from the home garden throughout the winter.

Asparagus

When the fern growth of asparagus has turned yellow it should be cut down and burnt as it will be of no further benefit in manufacturing plant food for the crowns. If growth is left standing too long, the ripe seeds fall and may germinate in spring in such large numbers that they become a nuisance, because if seedling plants become established they will overcrowd the bed. Fern growth should be cut 2in. above the ground (hedge shears are excellent for this purpose) and the bed weeded and tidied up. To increase the depth of soil over the crowns and to improve the humus content of the soil, now is a good time to apply a light dressing of compost or clean soil mixed with well rotted farmyard or poultry manure.

Rhubarb

Rhubarb beds should be kept free of weeds, which soon make rapid growth in the rich soil so necessary for good rhubarb production. Rhubarb grown for harvesting in autumn and early winter will benefit from a dressing of equal parts of blood and bone and superphosphate applied at the rate of 1lb. a square yard this month and lightly forked into the soil.

Broad Beans

Some home gardeners make an early sowing of broad beans during April, but though the plants will grow quite well during winter, if planted too early they usually fail to set pods should unfavourable conditions be experienced in early spring and seldom yield pods earlier than May sowings.

Broad beans will grow in almost any type of soil provided that it is well drained, but have a preference for a fairly heavy soil rich in humus.

Onions

Onions will thrive under a very wide range of climate and soil conditions but prefer a highly fertile, mellow, friable soil. The onion does best under rather cool conditions, with plenty of moisture during its early stages, but requires a reasonable degree of heat, together with dryness of both soil and atmosphere, for its proper ripening. If a crop matures at a time when there is considerable rainfall, it will be impossible to cure the bulbs and they will lack keeping quality. Where it is desired to produce onion plants for transplanting in spring or when plants are to be left in the seed-bed to produce an early crop for use as green onions the seed may be sown late in April or in May. In the North Island most onion crops grown for storing are transplanted in spring from seed sown this month, but in the South Island, because of severe winter conditions, seed is not sown until spring and is then sown directly in the field.

When sowing seed in autumn for spring transplants the home gardener should not sow seed before the last week of April. Plants grown from seed sown too early nearly always develop a large percentage of "thick necks" and such bulbs are useless for storing.

In preparing the seed-bed the land should be deeply cultivated and worked to a fine tilth and should have incorporated in the surface 4in. of a complete plant food containing nitrogen, phosphates, and potash. A suitable fertiliser mixture consists of blood and bone 1 part, superphosphate 1 part, bonedust 2 parts, and sulphate of potash 1/20 part (all by weight) applied at the rate of ½lb. a square yard. When available dry wood ashes may be used at the rate of ½lb. per square yard in place of the sulphate of potash. The seed-bed should be firmed and made level by rakings; for heavy soils firming should not be overdone, as the soil tends to consolidate excessively when subjected to winter rains.

Drills should be drawn out 2in. apart and ¼ to ½in. deep—the shallower depth for retentive soils. When onions are not to be transplanted the seed should be sown thinly; for growing plants for transplanting in spring the seed may be sown much thicker. Cover the seed with soil by drawing the rake lightly along the drill and firm the soil directly over the seed with the back of the rake

Firming the soil is very important, as it brings the soil into close contact with the seed and results in a better strike.

[*Sparrow Industrial Pictures Ltd. photo.*
Any variety of onion pulled in the young stage makes a spring onion.

After the young seedlings appear cultivation between the rows should be shallow and sufficiently frequent to suppress weeds and aerate the soil. Weeds along the seedling rows should be removed as soon as they are large enough to handle, or they will soon smother the young seedlings.

Varieties.

Spring onions: For the production of spring onions for salads throughout the year successive sowings may be made at almost any time as required. Any variety of onion pulled when young provides quite a good spring onion.

Pickling onions: For small white onions for pickling sow seed of White Lisbon or Silverskin in August. However, the small onions of other varieties will serve the same purpose.

Early-maturing types which may be sown in April for using in October are White Lisbon, Early Golden Globe, and Straw Spanish.

Large-bulbed varieties which may be sown in April for use in late November or early December are Giant Rocca and Ailsa Craig. (These often weigh up to 2lb. or more.) They are unsuitable for long storage but generally have a mild flavour and are favoured by many.

Storage onions: Varieties grown for storing are Pukekohe Long Keeper, Brown Spanish Long Keeper, and Turbott. These are medium-sized onions, and if not forced by the use of excessive quantities of nitrogenous manures and provided they are disease free and have been properly cured and stored, they will keep in perfect condition from harvesting in autumn until the following October.

Spring Cabbage

For early spring use sturdy, well-grown plants may now be set out. A fairly sheltered, well-drained position should be selected where there is no undue shading and the plants are best set on ridges with the manure concentrated in the ridge and directly below the plants. (See diagram on page 254.)

To grow cabbage successfully through the winter a soil rich in available food and which has previously had farmyard or poultry manure dug into it is preferred; if poultry or farmyard manure is not available, the plant rows could be fertilised before ridging with a mixture containing 10lb. of blood and bone. 3lb. of superphosphate, and ¾lb. of sulphate of potash applied at a rate of ½lb to 8ft. of row.

Plants should be set 15in. apart for the early- and second-early-maturing sorts and 18in. apart for the late varieties.

Varieties.

Early maturing: Flower of Spring, Springtide, and Early Offenham.

Second early (maturing about 2 weeks later): Charleston Wakefield, Enfield Market, and Golden Acre.

Late (maturing about 4 weeks after second early): Succession and Drumhead.

Spring Cauliflower

In localities where winter conditions are not too severe cauliflower may be set now for spring use, but in unfavourable localities it is best to delay planting until July, August, or even September. Cauliflower require practically the same treatment as cabbage, but are not as tolerant of extremes of temperature and moisture. These extremes sometimes cause a check to the plant at a critical stage of growth, causing the curd to "button" instead of reaching usable size. Severe frosts may also damage the curds of cauliflower and cause them to break down.

Recommended hardy varieties for planting now include All Seasons, Walcheren, Phenomenal (5 months) and Main Crop Phenomenal. Plants may be obtained from most seedsmen.

Spinach

Spinach, a much-valued vegetable, can still be produced from a sowing of the prickly or winter variety in early April in districts where autumn conditions are not too severe. The soil should be rich and of a good tilth. The seed should be sown thinly, ½in. deep in rows 12in. apart, and when the plants are about 2in. high liquid manure made of 1oz. of nitrate of soda in 4 gallons of water may be applied between the plant rows; this will promote more rapid growth. If the soil is wet, nitrate of soda may be applied as a surface dressing at the rate of 1oz. to 9ft. of row and worked lightly into the soil.

Care should be taken when applying nitrate of soda to see that it does not come in contact with any part of the plant.

Carrots

Although April is too late to sow carrots in most districts, a small sowing of a quick-maturing variety may be made in situations where growing conditions are favourable. The situation selected should be warm and sunny and the soil should be light and well drained. The crop is more likely to succeed if sown on ridges or in a raised bed. Ridges should be wide enough to accommodate a row 6in. wide. Flatten each ridge slightly and with a hoe draw out a flat drill ½in. deep and 6in. wide; sprinkle the seed thinly and evenly along the drill and cover it with ¼in. of fine soil and firm this with the back of the rake. For this sowing no thinning should be required. Raised beds should not be more than 4ft. 6in. wide so that they can be worked without having to tread on them. Rows can be 6 to 9in. apart and should run across the bed.

Good varieties for sowing now are Scarlet Horn and Early Gem.

[Sparrow Industrial Pictures Ltd. photo.

Tomatoes are easily damaged by frost, and in localities where early frosts occur and protection cannot be given it is advisable to gather the nearly mature fruits and store them under favourable conditions, where they will ripen.

[Sparrow Industrial Pictures Ltd. photo.

Pumpkins will keep longer if placed in a warm, sunny situation for about 10 days to cure before being stored.

Storage of Vegetables

Many vegetables which mature in autumn can be stored.

Tomatoes

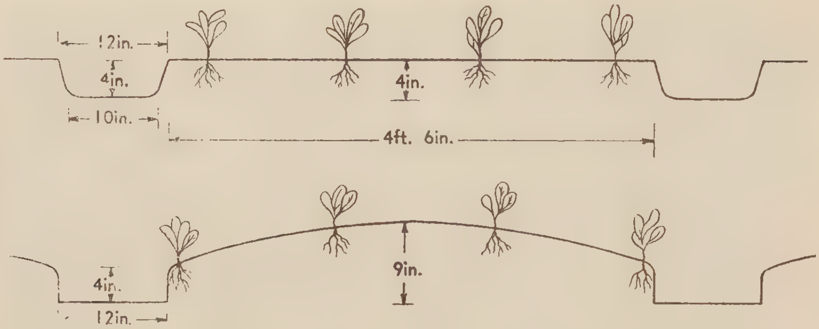
Where frosts are experienced in April tomatoes can be picked or the whole plant may be cut off and hung in a shed in a sunny position and it will be found that a large percentage of the fruit will ripen on the vines. If the fruit only is gathered, immature fruits can be made into jam, chutney, or pickle. Stalks should be removed from the more-mature fruit, which may then be placed in single rows in shallow boxes. The bottom of the box should be covered with slightly damp sawdust, which is also used to cover the fruit. Boxes can be placed one on top of the other and if kept in an ordinary kitchen temperature the tomatoes will ripen quite well. Fruit should be sorted once a week and ripe ones or any showing signs of decay removed.

Root Crops

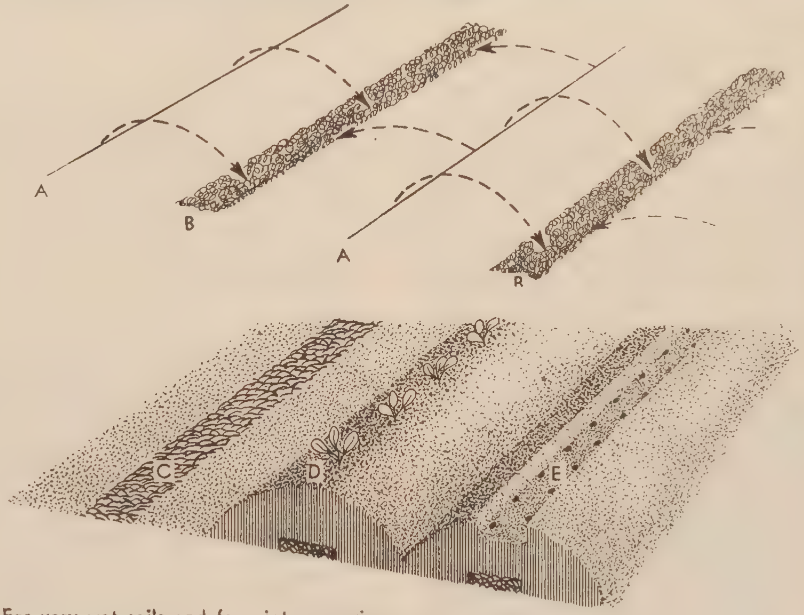
Carrots and parsnips are best left in the ground if garden space permits. Where the soil is likely to become very wet, however, they are best lifted and stored. In the South Island root crops store well, but in many parts of the North Island carrots and parsnips cannot be kept in storage for any lengthy time, as the relatively high temperatures during winter are favourable for the development of storage rots. Carrots and parsnips store best in sand kept reasonably moist.

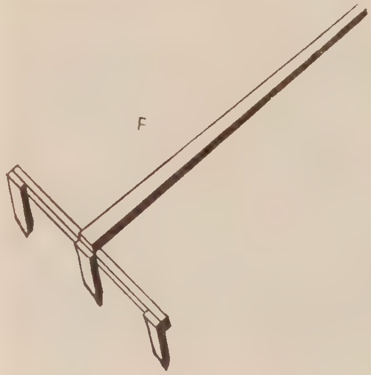
Swedes and beetroot keep quite well provided the roots are sound, if stored

THE HOME GARDEN IN APRIL



The upper diagram shows the correct method of making raised beds suitable for winter growing of vegetable crops such as lettuce, celery, spinach, radish, carrots, beetroot, turnips, and spring onions or for growing them on very wet soils. The area is marked out before forming beds and soil is taken from between the beds with a round-mouth shovel and spread evenly over the bed. This operation is repeated until the number of beds required is formed. Final levelling is done with a rake. The lower diagram shows beds incorrectly made. Sides are too steep and are liable to fall in; beds are too round on top, making them more subject to erosion; and the outer plants are set too close to the edge of the bed and have no room for development.





For very wet soils and for winter growing of vegetables such as cabbage, cauliflower, brussels sprouts, and peas fertiliser is best placed in a band and the soil ridged up. The upper diagram shows the correct spacings. A—Points 15in. from centre of manure bands where the soil is split and drawn up to cover the manure to form ridges. B—Manure strips 6in. wide. The lower diagram shows: C—Manure spread in a 6in. strip before ridging. D—Soil ridged with plants set along the centre of the ridge and with roots directly above but not in contact with the manure. E—Peas sown in a shallow flat trench on the ridge with the manure in a band about 3in. below the seed. F—A wooden marker for giving the correct spacing of ridges. In addition to the marker the home gardener will require a garden line to keep rows straight, a swan-neck hoe for drawing up the soil, and a rake for levelling off the tops of ridges.

in an open shed where conditions are cool and reasonably moist. They may be placed in a small, compact heap and covered with hay or straw to keep the roots from shrivelling.

Potatoes

Potatoes intended for storage should be dug carefully and should not be handled roughly when being harvested. All diseased and damaged tubers should be sorted out. Potatoes for storing should be mature and this condition may be recognised by the firmness of the skin, which should not come off easily when rubbed with the fingers. Although commercial growers use pits and clamps for storing potatoes they are not necessary for a small crop from the home garden. If placed in boxes and stored in a cool shed, sound, mature tubers will keep in perfect condition for months. In warmer districts of the North Island it is advisable to inspect tubers about 3 months after storing, and if any shoots are developing they should be rubbed off. To protect the potatoes from damage by the grub of the potato tuber moth D.D.T. dust should be sprinkled over the top of the tubers and the box tapped to shake some of the powder down among them.

Tubers intended for seed should be immersed in a solution of arsenate of lead, 1oz. to 2 gallons of water, to protect them from the moth and then placed in shallow boxes for greening and sprouting. Boxes can be stacked one on top of the other in the open provided some protective covering is given against frost and rain.

Kumaras

April is the recognised month for harvesting the kumara crop for storing, and little benefit can be gained by leaving the crop until later. Provided kumaras are handled carefully and stored properly they will keep in perfect condition with little or no waste until the following October.

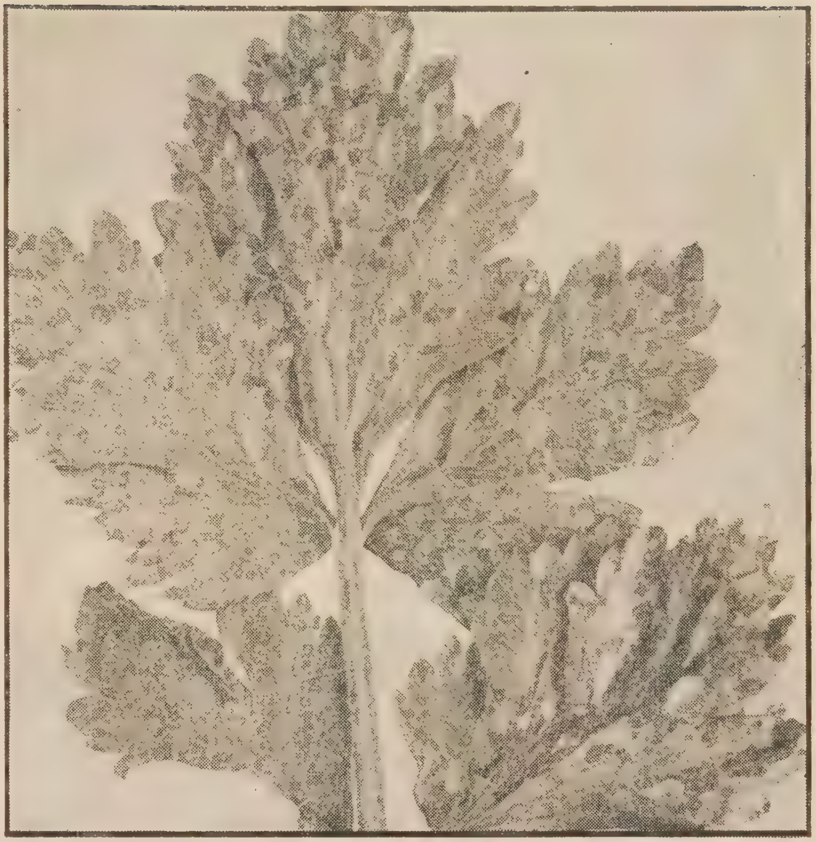
Tubers for storing should be dug very carefully and spread on sacks in a sunny, warm place for a few days so that they dry thoroughly, and if rain threatens they should not be left out overnight. Sort them carefully and set aside for immediate use any which are forked or injured.

Each tuber should be wrapped in paper, preferably brown paper, placed in a box or barrel between layers of perfectly dry sawdust, and then stored in a dry place in a shed where the temperature is moderate. A cover should be placed over the container to protect the kumaras from rats and mice.

Pumpkin, Squash, Marrows

Pumpkin and some squashes store well, but marrows should be used when green, as they quickly lose their flavour and deteriorate generally in storage. Pumpkins and squash crops planted in October and November will now be nearing the stage of maturity when they should be harvested and cured before storing.

A mature pumpkin may be recognised by pressure of the thumb nail; if gentle pressure does not puncture the skin, the gourd is sufficiently ripe and should be severed from the vine by cutting the stem to within 1in. of the base. If left too long, the stem is liable to be broken off in handling,



Leaf spot *(Septoria apii)* on celery leaf.

or it may puncture the skin of other fruits.

Good results have been obtained by curing pumpkins in a glasshouse or in a sunny, warm situation for 10 days at a temperature of 80 to 85 degrees F. and a relative humidity of about 80 per cent., after which they should be stored in a dry place where the temperature remains about 50 to 60 degrees F. Any dry, airy place where a favourable temperature can be maintained is suitable for the storage of gourds. Underneath the house is ideal if there is sufficient head room. They keep best when placed on edge in a single layer.

Control of Pests and Diseases

A section on control of pests and diseases in the home garden has appeared in successive issues since December, 1949, and other troubles and the methods of combating them are dealt with in the following section of this month's notes.

Cauliflower, Broccoli, Cabbage, Brussels Sprouts, Kale

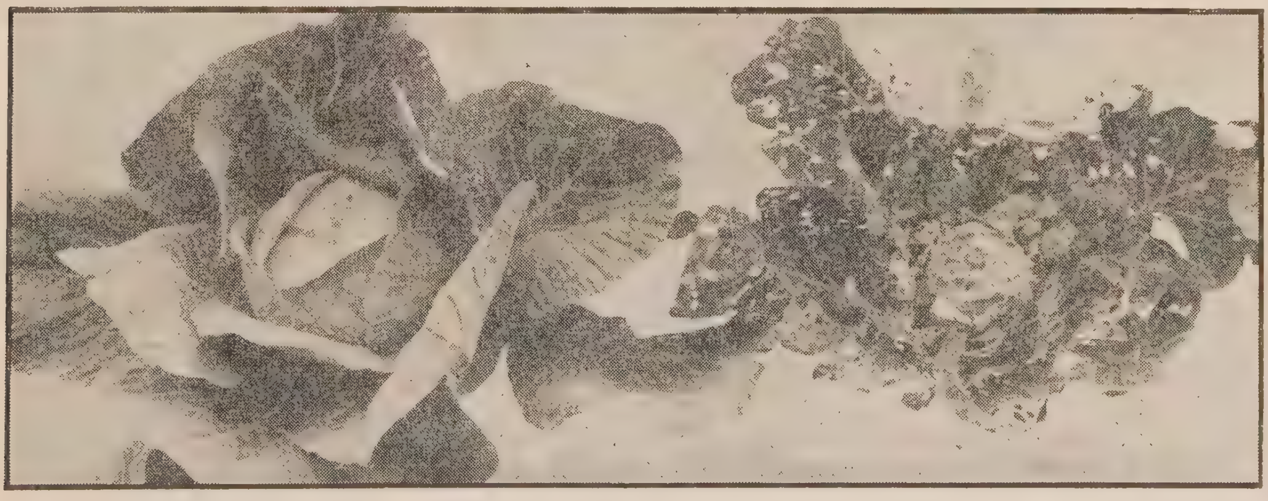
Club root (*Plasmodiophora brassicae*): This fungous disease is common only on acid soils and once introduced may be carried over in the soil for a lengthy period. The fungus enters the root system of the plants, causing rounded swellings, or it may cause a swelling at the base of the stem. Affected plants make little growth and wilt badly in the daytime because the swollen root system interferes with the food supply.

Treatment: Club root is more prevalent in acid soils; therefore a sound remedy is to apply lime to the soil before planting any brassicas. The amount of lime required will depend on the acidity of the soil, but a general recommendation for soil where club root has been severe is an application of 1lb. of carbonate of lime per square yard the first year, to be followed by annual applications of $\frac{1}{2}$lb per square yard. Drainage should be attended to and acid fertilisers such as sulphate of ammonia should be avoided. Affected plants should be removed and burnt.

Downy mildew (*Peronospora parasitica*) is a common fungous disease on brassica crops. It is especially troublesome on young seedlings. Infection appears first on the lower side of the seed leaves as a white mealy or furry growth. Badly affected seedlings or even large plants may be stunted and eventually killed.

Treatment: Avoid overcrowding the young plants in the seedling bed, as poorly ventilated plants are more likely to be affected by the fungus. Spraying the plants with Bordeaux mixture, 4oz. of bluestone and 5$\frac{1}{4}$oz. of hydrated lime to 4 gallons of water, or with copper oxychloride at 14- to 18-day intervals will give satisfactory control.

Grey mould (*Botrytis cinerea*): This fungus is well known to most home gardeners. It appears as a greyish, mouldy growth and is most common



[W. Barnard photo.

Effect of diamond-backed moth. Left—Sound cabbage kept free from attack with D.D.T. Right—Untreated cabbage severely attacked.

on cabbage. The fungus usually gains entry through a damaged leaf or stem and may destroy portion or the whole of the leaf or leaves of the plant. Plants that are growing rapidly and have succulent, tender foliage are most liable to attack.

Treatment: The use of fertilisers containing a good percentage of potash will assist in producing a sturdy, hardy type of plant which will have some resistance against attack by grey mould. As this fungus is spread readily by rain splash from one plant to another, it is recommended that all affected plants or portions of plants be removed and destroyed as soon as possible. Spraying the plants as recommended for the control of downy mildew will also help to control grey mould.

White butterfly (*Pieris rapae*): The caterpillars of this insect are particularly troublesome on cabbage and related plants and may cause considerable damage by eating holes in the leaves; on young plants they sometimes devour the whole leaf. The caterpillar is dull velvety-green with a very slender orange stripe down the middle of the back and may be any size up to $1\frac{1}{4}$in. long.

Treatment: Applications of D.D.T. 2 per cent. dust every 2 weeks or D.D.T. 50 per cent. wettable powder, $\frac{1}{2}$oz. in 4 gallons of water, every 2 or 3 weeks will give satisfactory control.

Diamond-backed moth (*Plutella maculipennis*): The caterpillars of this insect, associated with those of the white butterfly, are commonly found attacking the leaves of crucifers. The caterpillars are small, pale green, and not over $\frac{1}{3}$in. long. When disturbed they wriggle vigorously and drop to the ground on a silken thread. Small pieces are eaten out of the leaves, giving them a shot-hole effect; leaves are generally eaten from the underside, the upper epidermis being left over holes as a colourless, semi-transparent skin. Severely attacked plants become stunted and young plants frequently become blind.

Treatment: Spraying or dusting the plants with D.D.T. as for white butterfly will give a satisfactory control.

Vegetable weevil (*Listroderes costirostris*) is a leaf-feeding insect which attacks many kinds of plants, the more important being brassicas, tomatoes, potatoes, onions, and carrots. Damage is done to young plants through the adult weevil eating the stems through at ground level. Additional damage is frequently caused by the attacks of the legless larvae upon foliage. The adult weevil is about $\frac{5}{16}$in. long. It has a short, stout snout, while the corrugated wing cases are clothed with short hairs. Its colour ranges from light to dark green but some may be almost black. On the wing cases is a well defined V-shaped marking.

Treatment: Clean cultivation in addition to dusting or spraying the plants at regular intervals as for white butterfly will give control.

Cabbage aphis (*Brevicoryne brassicae*) is mostly troublesome during spells of hot, dry weather. Colonies of small, greyish-green insects, each about the size of a pin head, suck the sap from the leaves, causing them to curl and giving a greyish appearance to infested plants. If not controlled, they may cause serious damage and even kill the plant.

Treatment: To control cabbage aphis the plants should be sprayed with nicotine sulphate, 1 fl. oz. (7 teaspoons) in 4 gallons of water to which 2oz. of soft soap has been added. Nicotine sulphate sprays give best results when applied at the warmest part of the day. Repeat the applications if aphides again become present.

Celery

Leaf spot (*Septoria apii*): This is a fungous disease and one of the most important diseases of celery. It appears first as yellowish spots about $\frac{1}{16}$in. to $\frac{1}{8}$in. in diameter on the leaflets. As the spots enlarge the affected tissues turn brown and then nearly black. All above-ground parts may be affected, and unless the fungus is controlled plants may be stunted and useless.

Treatment: Spraying plants at 10- to 12-day intervals with Bordeaux mixture (4oz. of bluestone and $5\frac{1}{4}$oz. of hydrated lime in 4 gallons of water) or with copper oxychloride will control this disease. All trimmings, etc., from affected crops should be cleaned up and destroyed.

Soft rot (*Bacterium aroideae*) is a bacterial disease which causes a slimy, soft rot, usually in the heart of the plant. The organism gains entry through a wound or injuries caused by insects and slugs.

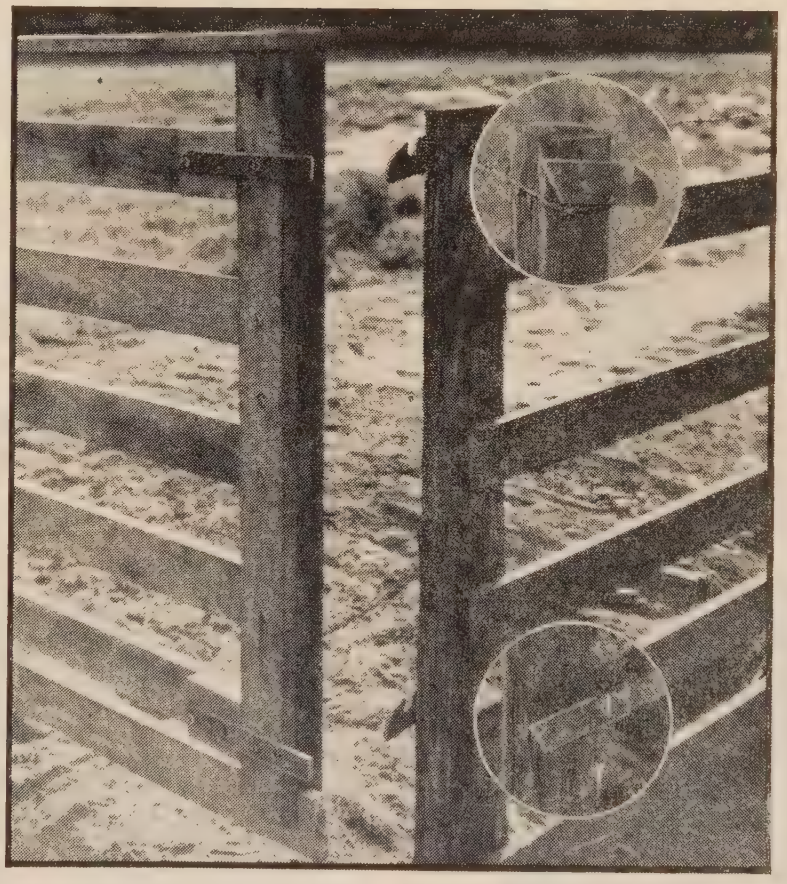
Treatment: Care should be taken that the hearts of the plants do not become covered with soil during earthing up. Slugs and insects should be kept down by dusting the plants with lime or old soot. Spraying with Bordeaux mixture as for leaf spot is also helpful for its control.

Acknowledgment

Acknowledgment is made to the Plant Diseases Division of the Department of Scientific and Industrial Research for assistance in the preparation of the section dealing with diseases and their control and for supplying the photographs included in this section.

◆

A Simple Gate Fastener



A simple but efficient gate fastener which can be made easily from metal strips is shown in the illustration above. It supports the weight of the gate and holds it firm top and bottom.

—*D. M. E. MERRY, Instructor in Agriculture, Nelson.*

Stacking and Feeding Out Rolled Bales of Hay

A NEW type of hay baler which produces rolled bales was described in the December, 1948, issue of the "Journal." That article resulted in many inquiries, not only from New Zealand farmers but from as far afield as South Africa and Tasmania, most of which sought information about stacking the round bales and feeding them out to stock.

STACKING the bales is simple if they are handled in the same way as bags of chaff. If an end stop of bales placed lengthwise is made in a barn, the bales may be stacked crosswise without fear of the stack moving.

Methods of feeding out the bales vary with the type of stock being fed. For sheep it has been found that placing the bale on a hay rack without unrolling it is quite suitable, as the sheep pull at it and are able to get all the hay they want. A simpler method used by some sheep farmers is to stand the bale upright and pass an iron standard through it.

Slicing and Cutting Bales

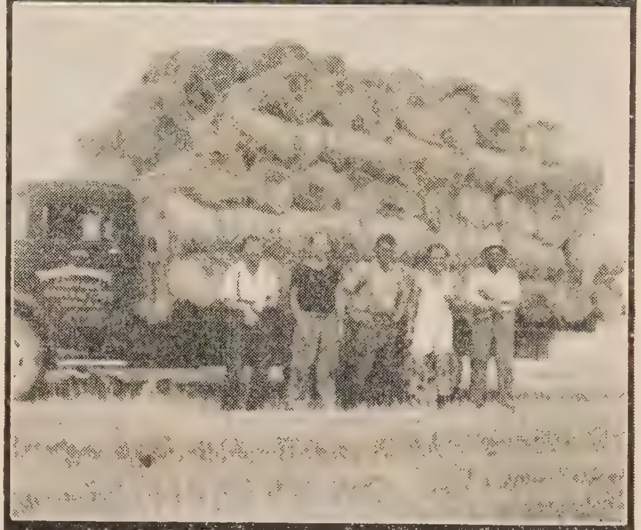
For cattle feeding some method of slicing or cutting the bale gives greater efficiency and less loss of hay. One method is to cut the bale longitudinally through its centre with a hay knife. If the knife is sharp, cutting the bale in this manner does not involve a great deal of work. The bale opens out very well and the hay can be spread out easily and economically. Usually bales are cut at the hay shed and stacked on a vehicle to be fed out in the paddocks.

A second method of cutting, being developed by the New Zealand agents for the baler, is a mechanical slicer or knife driven from the wheel of a trailer. The rolled bales can be put through the slicer while being fed out, the trailer travelling over the paddock at between 8 and 12 miles per hour. Any size of slice can be made, and if the hay is cut thinly, it can be teased out easily by the cattle.

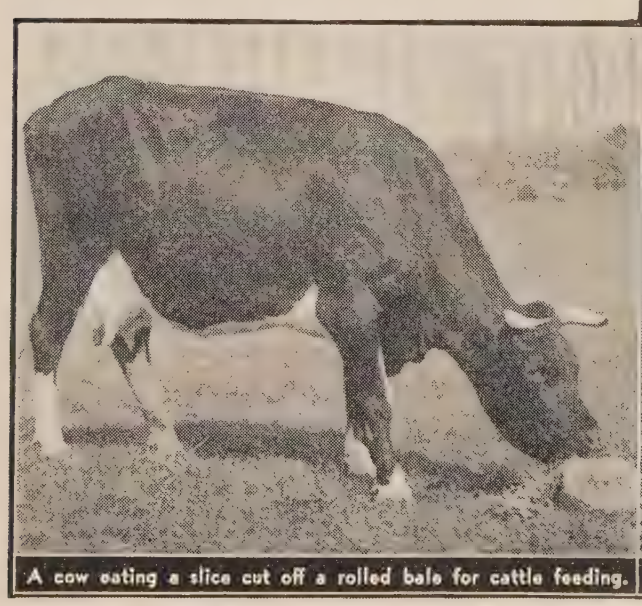
—*J. D. WRAIGHT, Fields Instructor,*
Department of Agriculture, Timaru.

[*Photograph below by courtesy of Andrews and Beaven Ltd.*

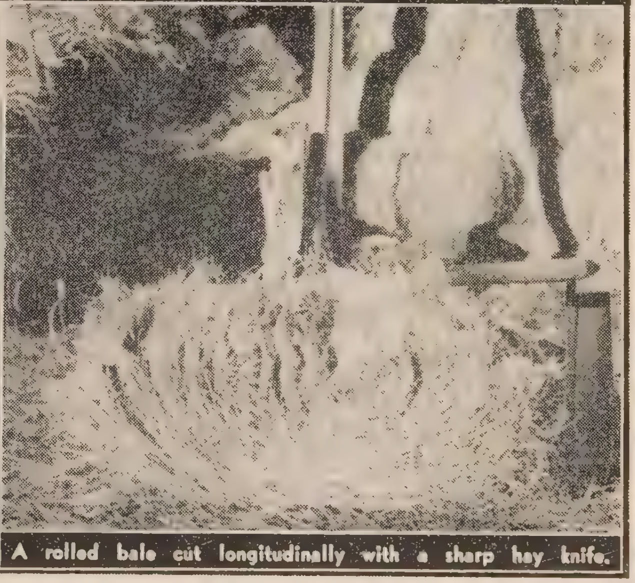
Rolled hay left in the paddock by the automatic baler.



A good load of rolled bales stacked on a lorry for transport.

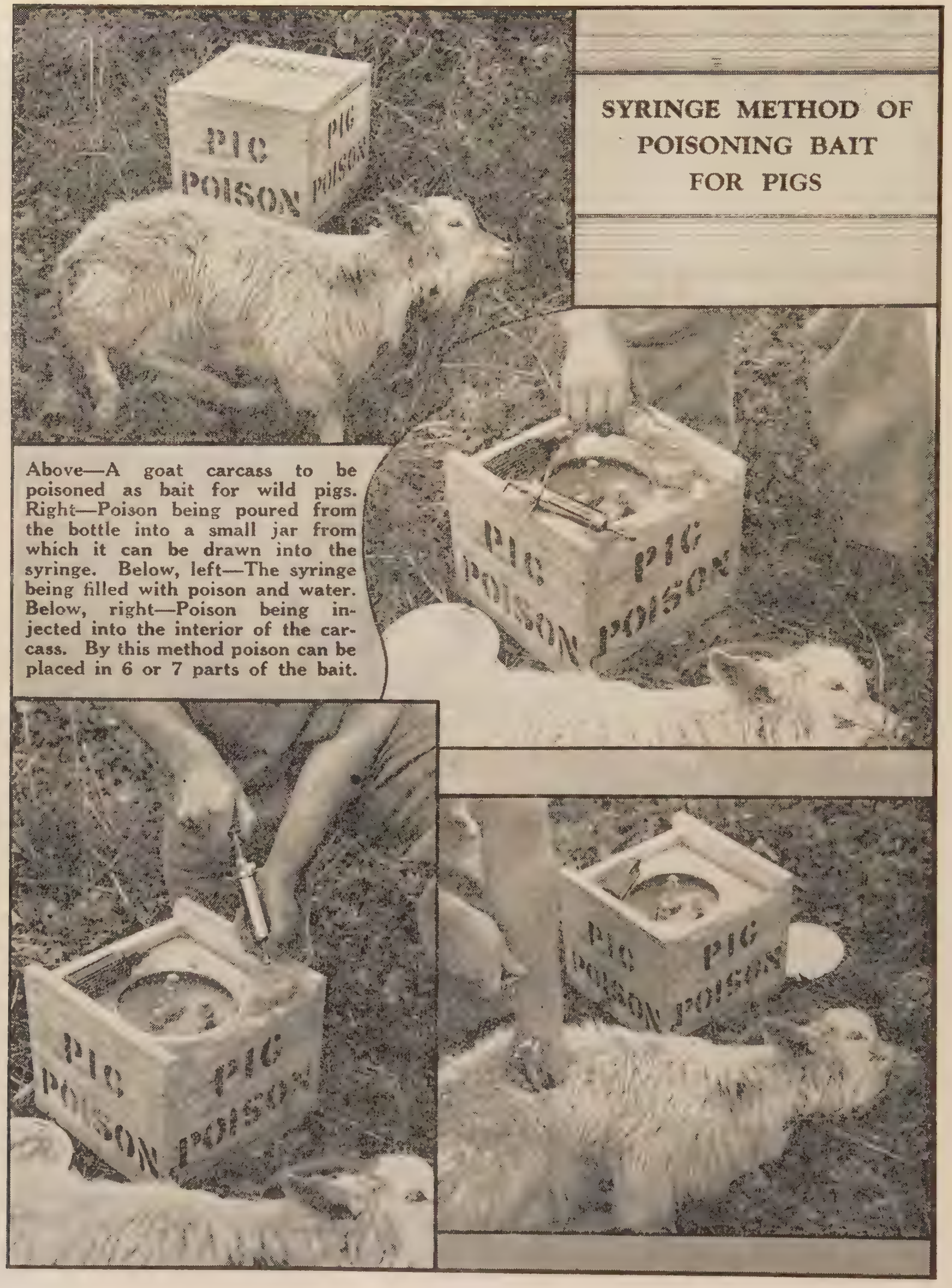


A cow eating a slice cut off a rolled bale for cattle feeding.



A rolled bale cut longitudinally with a sharp hay knife.

SYRINGE METHOD OF POISONING BAIT FOR PIGS


PIG POISON
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Above—A goat carcass to be poisoned as bait for wild pigs. Right—Poison being poured from the bottle into a small jar from which it can be drawn into the syringe. Below, left—The syringe being filled with poison and water. Below, right—Poison being injected into the interior of the carcass. By this method poison can be placed in 6 or 7 parts of the bait.

[Fraser Niederer photos.

Destruction of Wild Pigs by Poisoned Baits

IN some parts of New Zealand, particularly on North Island hill country near areas of bush, the most annoying and destructive pest is the wild pig. This article by G. R. Mackintosh, Inspector of Stock, Department of Agriculture, Hamilton, tells of successes achieved in the destruction of wild pigs by poisoning and describes the method of laying the bait.

[Fraser Niederer photo.

A poisoned sheep carcass left as bait on a pig track in bush country.

AREAS affected by wild pigs usually are well away from the main highways, so the depredations of the animals are not seen by many people who know of the other pests with which the farmer has to contend, but undoubtedly the wild pig is responsible for losses amounting to tens of thousands of pounds annually.

The greatest economic loss caused by it is the destruction of good pasture, usually at a time when it is most required—in late autumn or winter. The wild pig has a marked preference for the better-class grasses containing clover. If valuable pasture over which pigs have rooted is not resown, the subsequent growth usually contains deleterious weeds such as bidibidi.

As well as the damage caused by rooting of pasture, substantial losses result from lambs being killed during the lambing season, broken and insecure fences, time spent in hunting the pest instead of carrying out other farm work, and dogs lost or spoilt in hunting. The farmer so affected must also bear the cost of such items as seed, rifle, ammunition, and the replacing of fencing materials. Pigs rooting on hill slopes, particularly those adjoining roadsides or railway cuttings, are suspected of causing slips and erosion. Before the war farmers were assisted in controlling the pest by Maori settlements, members of which regarded the wild pig as a valuable source of food, and by sportsmen who enjoyed the hunting, but during the war and of recent years this help has diminished considerably.

During the early war years the Livestock Division of the Department of Agriculture carried out trials with various poisons for the eradication of wild pigs in an effort to assist farmers who had to deal with the difficulties presented by increasing numbers of wild pigs at a time when farm labour was very scarce. The most effective method was found to be the use of a phosphorus-carbon bisulphide mixture in a carcass bait. Strychnine, a poison deadly to other animals, proved practically useless, as the wild pig has a high degree of tolerance to it. Years ago Darwin in his records of the voyage of the Beagle noted that the gold miners of Nicaragua were unsuccessful in their efforts to destroy wild pigs with strychnine.

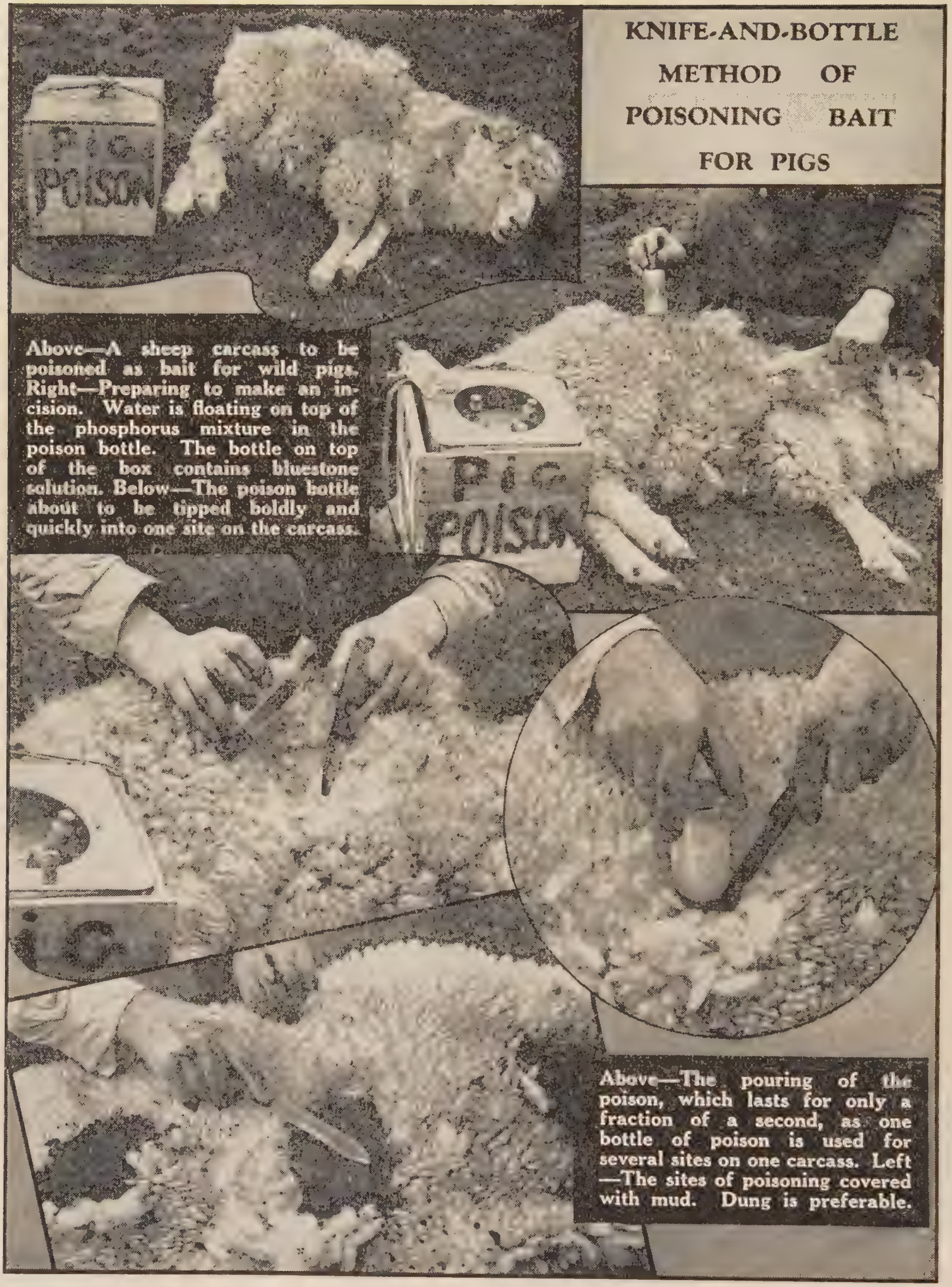
After some progessive King Country settlers had demonstrated the usefulness of poison as an economic method of dealing with wild pigs, the county councils of Taumarunui and Kaitieke, with State assistance, undertook poisoning campaigns. In each instance the effort was successful and was considered worth while. Mr. W. Stanton, Engineer to the Kaitieke County Council, submitted two reports on the campaign to his council, and these were published in the April, 1944, issue of the "Journal of Agriculture." Extracts from these reports read:—

"Baits were laid on 35 properties, and on only five of these was no bait

[Fraser Niederer photo.

Pasture land that has been rooted to a slight extent by wild pigs, probably small ones.

KNIFE-AND-BOTTLE METHOD OF POISONING BAIT FOR PIGS



Above—A sheep carcass to be poisoned as bait for wild pigs. Right—Preparing to make an incision. Water is floating on top of the phosphorus mixture in the poison bottle. The bottle on top of the box contains bluestone solution. Below—The poison bottle about to be tipped boldly and quickly into one site on the carcass.

Above—The pouring of the poison, which lasts for only a fraction of a second, as one bottle of poison is used for several sites on one carcass. Left—The sites of poisoning covered with mud. Dung is preferable.

[Fraser Niederer photos.

at all taken. Strange to say, on several of the properties where no bait was taken pigs were numerous, and were known to take dead unpoisoned carcasses in the vicinity of the bait, but would not touch the bait. . . . On the other hand, bait was immediately taken on other properties where pigs were not nearly so numerous. Some carcasses remained untouched for 2 months and were then consumed, and dead pigs were found in the vicinity. It is impossible to say how many pigs were killed by the poison. More than 100 have been counted, and it is reasonable to assume that this number could be multiplied several times. The owner of one of the worst-infested properties reports excellent results. To use his own words: 'The whole place is at present stinking of dead pigs.'

"The most satisfactory feature of the whole scheme is that on properties where pigs were numerous a marked decrease in the pigs about after the poison was laid was noticed. One man whose property adjoins badly-infested country informed me that previous to his neighbour commencing to poison 2 or 3 years ago he could shoot on his property easily 150 pigs in a season. Now he rarely sees one.

"Another important fact has been established: Pigs will eat pigs. Many pig carcasses have been wholly or partly eaten by other pigs. The importance of this fact will be obvious. If pigs poisoned by the bait laid are eaten by other pigs, it is reasonable to assume that they will be poisoned by consuming the entrails of the poisoned pig. Just how far this process of extermination is carried I am not prepared to say, but I think it is reasonable to claim that for every pig poisoned by the bait at least one other pig will die. . . . "

Departmental Campaigns

In 1947 officers of the Department of Internal Affairs carried out a campaign of poisoning wild pigs on State Forest Reserves and abandoned farms in western Taranaki. Goat carcasses were the only baits used. The first work was undertaken in summer. The goat carcasses were skinned and the poison injected by needle or poured from the bottle into an incision in the carcass. Some baits were eaten almost immediately and others remained 6 weeks before being taken. Though most baits were eaten and pigs appeared to decrease in numbers, the results were not very impressive.

A second campaign was launched in winter, when the baits were taken more readily and results were excellent. Pigs were found dead in the vicinity of the remains of consumed baits. After a year's operation the officer in charge reported that not one farmer's dog had been poisoned and only one bird was stated to have been found dead. Two methods of placing the poison in the carcass were used—injection with a syringe and pouring the poison from a bottle into an open incision. The use of a syringe was preferred.

Dangerous Ingredients

The main ingredients used in the poison mixture are dangerous in the hands of people unacquainted with their properties. When taken out of water phosphorus starts to burn, and carbon bisulphide is a most inflammable liquid. Therefore the mixing of the poison by the farmer is not advised.

The Department of Agriculture will make ready-mixed poison available from its poison depot in Frankton for sale to county councils and farmers in containers that will ensure safe transport by rail, ship, lorry, or pack-horse.

Sufficient poison for one sheep or goat carcass is contained in each bottle, which is transparent and well corked. The bottle also contains an equal quantity of water, which floats on the surface of the poison. These bottles are packed in moist sawdust in a sealed and soldered tin, which in turn is packed in a solidly-made wooden box. Each box contains 10 bottles. Also in the tin is a bottle of 10 per cent. bluestone solution to be poured on the site should a burn be received by the operator; should a dog be suspected of having eaten poison bait, a teaspoon of this solution can be administered internally. If a cattle or horse carcass is used for bait, three or four bottles of poison should be used according to the size of the animal. The cost of a box of 10 bottles of poison is £1 5s., railage freight paid. Orders should be placed with the Department of Agriculture, Hamilton. If payment is made by cheque, exchange must be added.

A campaign for the poisoning of wild pigs should be planned for about May, when the pigs are likely to be leaving the denser bush areas in search of food and when, with the colder weather, they become more hungry for meat. Sheep, goat, horse, or cattle carcasses are all useful, but sheep carcasses are taken most readily. It is preferable that groups of neighbouring farmers undertake operations at about the same time.

Poisoning the Bait

After obtaining the poison the operator should lay a carcass bait in the vicinity of the haunts of the wild pig, preferably in a shady place on a pig track, in the bush or scrub, or somewhere well away from dogs. With a syringe to which is attached a long needle the poison may be injected into various parts of the abdomen, thorax, and hindquarters of the carcass. If the syringe needle is not long enough to reach the bottom of the poison bottle, the operator should provide himself with a small jar or tin from which the poison can be drawn into the syringe. The water floats over the phosphorus mixture as a safety measure, and some water as well as poison must be drawn into the syringe each time it is used. Immediately it is empty the bottle should be disposed of in such a way as to obviate danger to dogs and stock. It is important that the plunger of the syringe be tight so that the poison cannot get behind it and so on to the hands of the operator. The syringe should be filled with water both before and after use.

Because of the muscle firmness in the hindquarter of a carcass some farmers first gouge out a space in the meat into which the poison can be injected. Skinning the carcass is not essential, but some farmers prefer to skin the upper side of a goat, cattle, or horse carcass because it is believed to hasten the putrefaction which attracts the pig.

The wild pig is a very wily animal with a highly-developed sense of smell, so as little trace of the human presence as possible should be left. The bait should not be moved after it has been poisoned.

Another method of administering the poison is by bottle and knife. This has given good results in many instances, but some farmers consider that it causes the bait to be less attractive. A long-bladed, sharp knife is used to make deep holes in the internal organs of the carcass, and the poison is applied by tipping the bottle boldly, but for only a fraction of a second, to allow a small quantity of the poison to pour into each of four or five holes, so that one bottle is sufficient for the whole carcass. After the poison has been poured it is a good plan to cover the incision with dung or mud. Mr. C. H. McCutchan, of Ngutunui, South Auckland, obtained excellent results with this method. Of 18 sheep and goat carcasses laid by him 17 were taken. Poisoned pigs were not always found, but after every time a bait was taken fresh rooting was absent.

Pigs eat dead pig carcasses, though not as readily as they do sheep or other carcasses. Some years ago the writer obtained a good deal of convincing evidence that pigs had been poisoned by eating portions of other pigs which had been poisoned previously. However, a pig carcass into which poison has been injected usually remains for much longer than other baits before pigs touch it.

Precautions

Though the poison is prepared in ready-mixed, measured quantities and in suitable containers, the main precautions to be taken are:—

Store the poison by burying it if suitable buildings are not available.

Always carry the poison in a substantial container. Never be so foolish as to carry a loose bottle of poison about.

Keep the poison away from the clothes when it is being used. If the poison gets on any clothing, remove the garment immediately and wash it thoroughly.

Keep dogs away from poisoned carcasses.

In the past wild pigs have contributed substantially to the abandonment of some farm lands from which fat lamb producers obtained ewes. If New Zealand is to play the part in food production for which it is suited, elimination of losses caused by wild pigs is an important measure. Farmers at present affected would then find it easier not only to increase their ewe flocks but also to extend their pasture areas. The white-faced breeding ewe is most suitable for the production of fat lambs, and far too many farmers overlook the fact that some increase in such stock can be obtained from areas of pasture broken in from pig-infested bush country.

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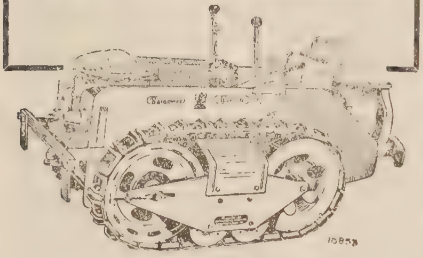
GARDEN TRACTOR



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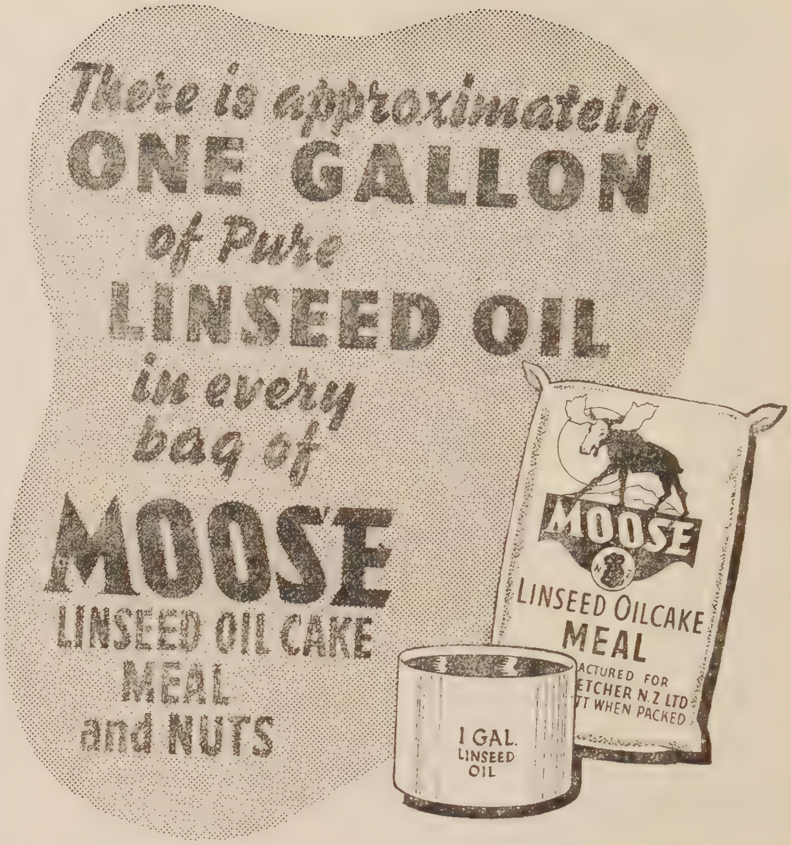
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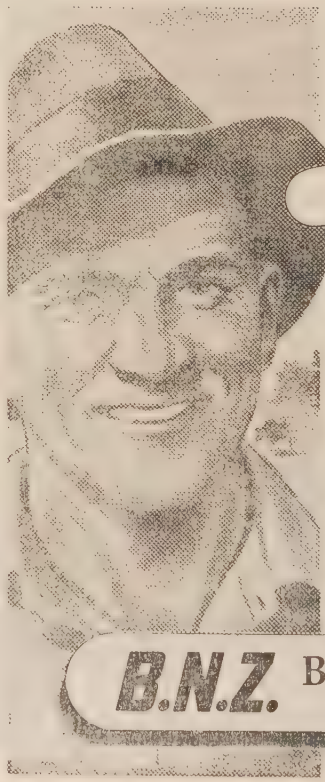

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Production of Wholesome Milk for Town Requirements

By T. A. COULTER, Supervising Dairy Inspector, Department of Agriculture, Christchurch.

SHED management and care of equipment which will result in the production of wholesome milk for town supply are dealt with in this article. It is the concluding portion of a discussion of the production of milk for town supply, the first part having appeared in last month's "Journal."

A modern milking shed on a town milk supply farm.

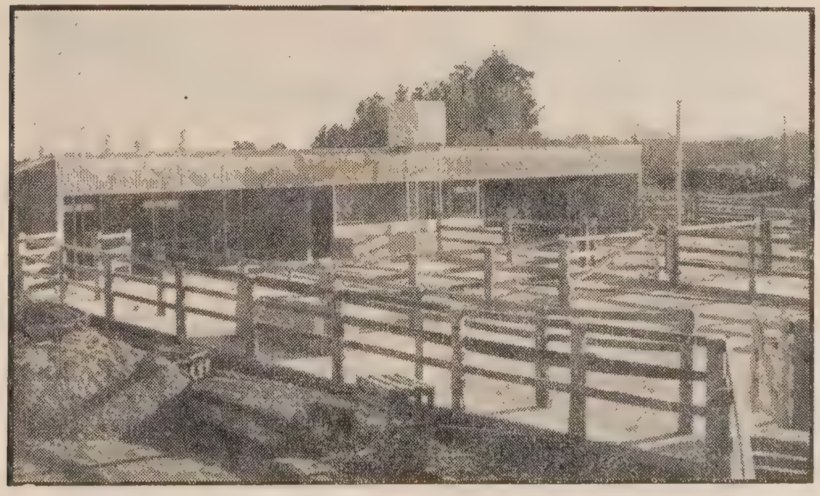
TOWN supply dairies are subject to regular and frequent visits from Inspectors of Stock or Dairy Inspectors (in larger centres). Though these officers have very wide powers, they exercise them with the greatest discretion and it is seldom necessary to invoke the penal section of the Regulations. Far better results are achieved by instruction and co-operation with milk producers and this has proved the keystone of success in the milk business.

Shed Management

As the consumer becomes educated to demand cleaner, better-quality milk, so must the dairy farmer prepare himself to meet that demand. By the production of cleaner milk, not only will an important safeguard to the health of the community be provided, but the farmer will be in a position to offer a further guarantee regarding the keeping qualities of his product, with the possibility of advantage to himself through increased consumption.

Cows should be driven quietly when being brought to the shed for milking. Dogging, hustling, and the use of sticks should be avoided, as agitation of the cows diminishes the milk flow. If workers' movements in the shed are quiet and quick, more profitable results are obtained and the cows are better behaved. In such cases it is quite common to see whole herds pass through the shed without it being dirtied.

It is advisable to milk at regular hours and adopt, as far as practicable, even periods between milkings. The fat content of milk is affected by irregular periods between milkings. For instance, when milking begins at 5 a.m. and 3 p.m. the fat content of the morning's milk may be expected to be so much lower than that of the evening's milk that serious difficulties are often created for the milk vender or the manager of the treating house.



An unusual layout under construction. It is a double shed, with the dairy in the centre, in which two herds (280 cows) are to be milked separately. The tank on the roof is for supplying water for water heaters and for washing down, not for cooling milk.

Gateways and Approaches

Neglected gateways and muddy approaches always present problems, but much can be done in most cases to keep them in reasonably good order. Gateways and approaches if neglected harbour the organism responsible for foul of the foot, and the udders of cows become so dirty from them that it is almost impossible to clean the udders before milking. In fact in such cases cleaning takes longer than milking; clean milk cannot come from dirty cows. To avoid the risk of contamination from dirt or manure found on the cows, particularly during winter, the long hairs should be clipped from the udders, legs, flanks, bellies, and tails if cows are stalled, and at least off the udders for those not stalled. This procedure is well worth while and makes the washing and cleaning of udders quicker and more effective and as a result cows do not catch chills.

Footbath Useful

An efficiently designed footbath at the entrance to the cowyard is very useful in helping to keep the yard clean. When the floor of the shed and the yard are thoroughly wetted before each milking the task of washing down and cleaning after milking is reduced to a minimum, so it is always advisable to have plenty of water readily available. Washing down is more likely to be neglected if there is a poor flow from the tap.

Milkers should wear clean clothes, preferably overalls, and they should wash their hands thoroughly with soap and water and dry them on a clean towel. Hands should be kept clean during milking.

Anyone with a sore throat, acute cold, or infection about the hands should not milk cows or handle their

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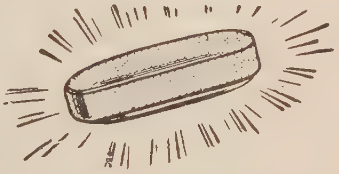

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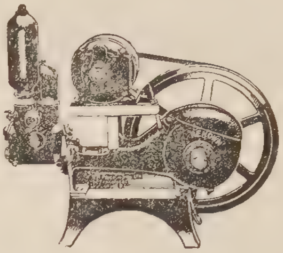

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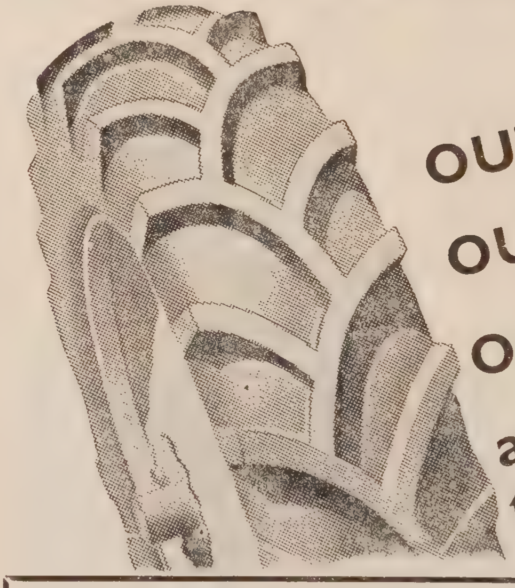

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Neglected gateways and approaches harbour the organism responsible for foul of the foot, and the udders of cows become so dirty from them that it is almost impossible to clean the udders before milking. Left—A badly neglected gateway; the farm is not a registered dairy. Right—Well-kept gateways.

udders, since many of these infections may be transmitted to the milk.

Immediately before each cow is milked the udder and teats should be washed with clean water (warm water is preferable in cold weather) and wiped with a clean cloth. It is better not to wash teats than to wash and not wipe them, because the washing dissolves the dirt and unless the udder is wiped clean, drips of water containing dissolved dirt are drawn into the teat cup and thus into the milk. Many types of cloths are used, some of them useless. A good idea is to purchase a length of towelling and divide it into pieces approximately 1ft. 6in. square. This material gives long and excellent service.

Cloths must be washed thoroughly and sterilised after each milking and hung on a line in the sun when possible.

A separate cloth and bucket should be used for each bail and the water changed frequently. The practice of using a small piece of unwashed, smelly cloth, which, after use, is squeezed out and left screwed up on a rail in the shed, cannot be condemned too strongly. There is nothing worse as a breeding ground for bacteria than a dirty cloth.

Strip Cup

Every cow should be tried, using a strip cup, before putting on the machines. Worn parts of the shed floor under the cows are caused by milking the first few streams on the floor; milk discharged in this way destroys the concrete and helps to spread disease. The strip cup should be used in every milking shed, as by milking the first few streams into it any sign of mastitis can be detected. Milk from cows suffering from mastitis may be dangerous to public health and every person milking cows is under an obligation to take every precaution to ensure that only milk from healthy cows is used for the milk supply. Further, as the fore-milk contains only about 1 per cent. of fat and has a high bacterial count, it is better discarded.

Greenhide leg ropes are preferable to rope, and all leg ropes, stools, door handles, etc., should be kept clean, as this plays an important part in keeping the bacterial count of milk at a low level. By the adoption of clean methods in the milking shed the spread of disease in the herd is to a large extent avoided.

Feed Taints

One of the real problems of a town milk producer is to supply milk free of weed or feed taint. Land cress, watercress, and buttercup are common weeds which produce taint. It has been found that taint from land cress passes into the milk in the udder within 30 minutes of the cress being consumed and persists for several hours, sometimes longer than 12 hours.

White clover, subterranean clover, red clover, silage, lucerne, and chou moellier all produce an off flavour, as do brewer's grains when fed in excessive quantities or when sour.

To guard against weed or feed flavours it is safest to feed cows soon after the milking; cooling the milk relieves the position only partially.

Contamination

Modern practice in dairying for town supply demands the production of a milk as nearly germ free as possible, the ideal raw product being clean,

Cinder track for cows approaching yard—mid-winter scene.

PRODUCTION OF WHOLESOME MILK

Footbath for cows entering yard.

sanitary milk having a low bacterial count. There is an ever-present risk of milk becoming contaminated, because wherever milk is produced bacteria will abound and the dairyman must deal with them constantly.

The cow's mouth is a fount of lactic bacteria and the animal's coat harbours a mass of all types of bacteria which come from saliva, manure, earth, hay, and silage. Consequently, if cows are fed on hay at milking time, it is impossible to prevent dust and bacteria from getting into the milk.

Milk is such an ideal culture medium for bacteria and is so frequently at the ideal temperature that once bacteria gain access to it they multiply with extreme rapidity. The rate varies, but under warm summer conditions and with plenty of moisture 1 germ can become 8 in 1 hour, and in 8 hours the total will have grown to 16,000,000.

It does not take very long, therefore, for neglected equipment to become coated with a slimy covering of millions of bacteria.

As milk is quite a viscous liquid and adheres to pipes and equipment, only recognised methods of cleaning are effective and it must be emphasised that the cleaning must be carried out immediately after milking and twice daily.

Water-heating Facilities

Every dairy should be provided with facilities for boiling plenty of water. If an electric cylinder is used, make sure it is large enough for the job it is required to do and have it set near the floor and fitted with a large tap which just clears the bucket, to avoid loss of heat while the bucket is being filled. Make certain that the cylinder is a dairy type—one which does not refill automatically as it is emptied. Occasionally house-type cylinders (ones which refill automatically as the boiling water is drawn off) are installed and the following table of successive drawings off of water from a cylinder of this type shows how ineffective they are:—

The first bucketful showed a temperature of 206 degrees F.

The second bucketful showed a temperature of 165 degrees F.

The third bucketful showed a temperature of 136 degrees F.

The last 2 bucketfuls of hot water are utterly valueless for cleaning and sterilising milking machines. As milking machines can be cleaned effectively only with water which is boiling or nearly boiling, the thermostat should be adjusted to cut in at 196 degrees F. and cut out at 206 degrees. Far too many electric cylinders are set as low as 130 degrees to 160 degrees. Farmers often adopt the correct procedure for cleaning plants only to have trouble through the low temperature of the water used. Every town milk producer should have a dairy thermometer to check the temperature of the hot water regularly and also to check his milk-cooling temperature.

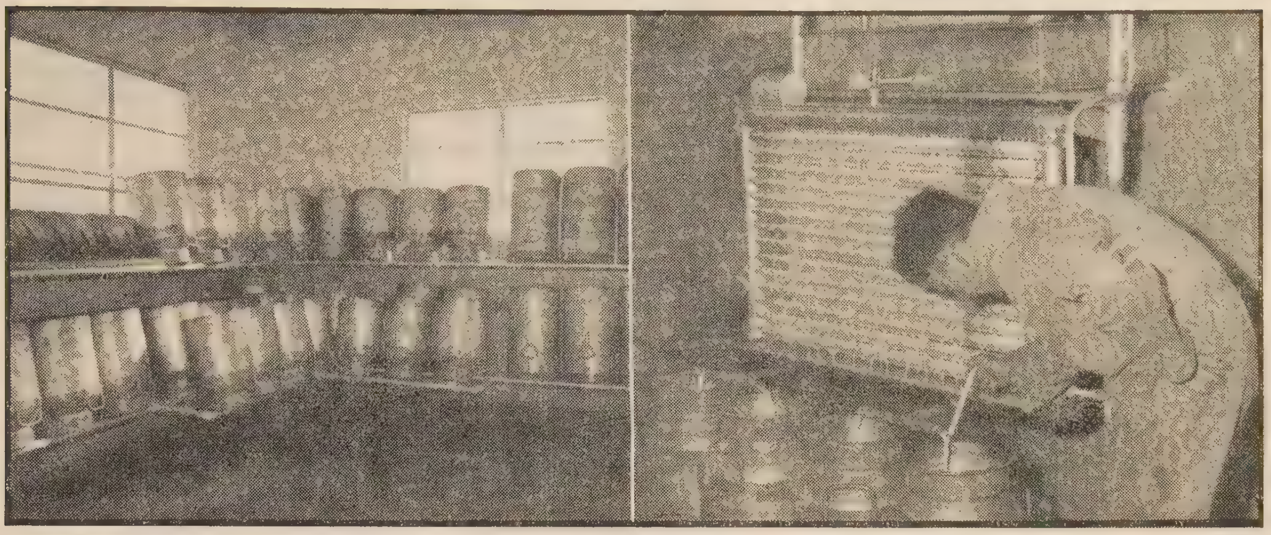
Cleaning Utensils

Brushes are to be preferred to cloths for washing dairy utensils. They remove dirt from corners and can themselves be more readily cleaned. All utensils should be washed in tepid water before they are scalded, because hot water causes the albumen in milk to coagulate and form a scum which is difficult to remove. After being washed in tepid water cans and utensils should be scrubbed in hot water containing washing soda and then scalded in clean boiling water. If steam is used, it should be used only after the dairy equipment has been washed and cleaned thoroughly. Nothing should be dried with a cloth. If utensils are scalded correctly water will be evaporated quickly by the heat of the metal. Utensils and cans should then be placed on a draining rack, not stood upside down on the floor of the dairy, where they remain damp and develop bacterial growth and an unpleasant, stale smell.

The method of cleaning described keeps tinware bright, free from rust and bacteria, and does not injure the coating of tin.

All milk cans should be cleaned when returned from the treating house. Although it is the responsibility of treating houses to clean the cans as soon as they are emptied, this does not relieve the producer from his responsibility of putting milk in clean cans. Mistakes and accidents are always possible.

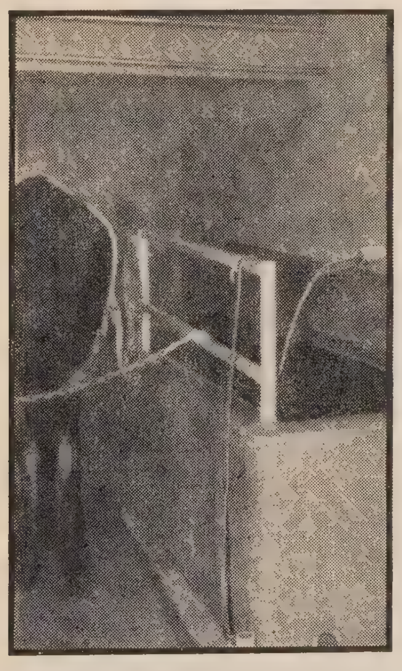
Milking shed and yard being watered preparatory to milking.



Left—Modern dairy, showing can racks made of piping. Right—Checking temperature of milk with a thermometer. The can filling system assures even quality of milk in the four cans.

If the producer puts his milk in a dirty can and has the milk rejected, he has only himself to blame. He must protect his own interests by treating every can returned as a dirty can no matter what its apparent condition.

It is difficult at present to procure new milk cans. Old, rusted, dented cans are objectionable for sanitary reasons. It is hardly possible to clean them thoroughly, as the milk lodges in the rough surfaces, they retain moisture, and are difficult to dry. They soon develop a foul smell and generally pollute the milk put into them. Too much attention cannot be paid to milk cans.



Ample water for washing down: Overflow from milk cooler leads into a trough in the shed. Note the greenhide leg rope.

Cleaning Milking Machines

The following are some important points in connection with the washing of milking machines.

Some milking machines are simple and effective; others are fundamentally simple but complicated with gadgets. It is for the farmer to say what he wants and it is the farmer who has to keep the plant clean.

Clean, cold water should be drawn through the machines before milking, but care should be exercised to ensure that the plant and milk vat have been drained thoroughly before milking begins, as no excuse is accepted for added water in milk. Immediately after milking at least **1 full bucket** (preferably more) of clean, cold water should be put through each set of cups until the water is flowing quite clean from the releaser. This reduces materially the work of the caustic solution, which follows. Scrub the outside of all teat cups, rubbers, etc., with hot water and washing soda.

Draw at least 1 gallon of boiling water and caustic soda (1 heaped teaspoon to 4 gallons of boiling water) through each set of cups, lifting the cups out occasionally to give a surging effect. If the vacuum tank is of 4 gallons or greater capacity it is an advantage to put the caustic water through all the cups at the same time by having a bucket for each bail. If not, do not always commence washing at the same end; when washing is begun from different ends each time each set of cups gets the hottest water alternately.

The caustic solution should be followed with preferably 2 gallons of boiling water through each set of cups, at the same time putting a travelling brush through the main milk pipe. If a milk lift is used, treat it as a separate unit, using fresh caustic and boiling water for the purpose.

The air system should have caustic water and boiling water put through after each milking. One air rubber often neglected and which may be responsible for high-bacterial-count milk is the breather rubber which connects the air system to the releaser. Milk vapour soon pollutes this rubber.

Milk rubbers must not be brushed inside, as this only scores them and makes crevices for bacterial growth.

All metal pipes must be brushed to keep them clean and to avoid the development of milkstone.

Do not put cold water through the plant after the boiling water. There is sufficient heat in boiling water to dry the plant out.

After washing and sterilising the plant remove all plugs, releaser, and vacuum tank lid and hang teat cups and rubbers up to drain in the milking shed or dairy, but do not put rubbers in the sun. Bacteria grow on a wet surface and by having the plant sterile, dry, and open to the air, the growth of bacteria is retarded most effectively.

It is a wise practice to renew rubberware before it perishes, because in that state it, too, harbours bacteria and cannot be cleaned effectively. Soft inflations should be changed every 6 weeks if up to 15 cows are milked per set of teat cups at each milking—more often when more cows are milked. The life may be extended by removing the inflations once a fortnight and boiling them for 4 or 5 hours in a 5 per cent. caustic soda solution. This process removes the butterfat, which is responsible for the rubber becoming flabby. Heavy moulded inflations which are used for long periods should be removed and boiled in

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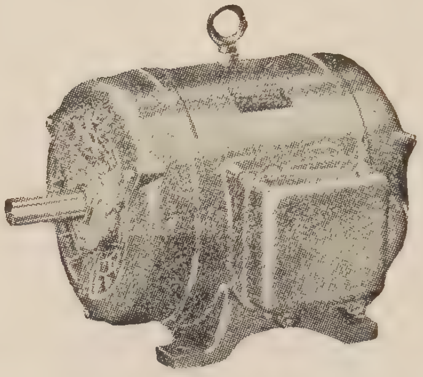

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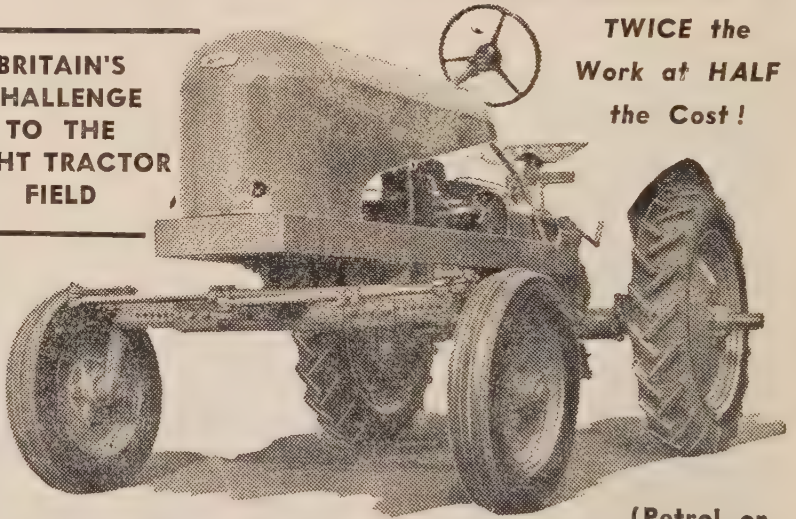

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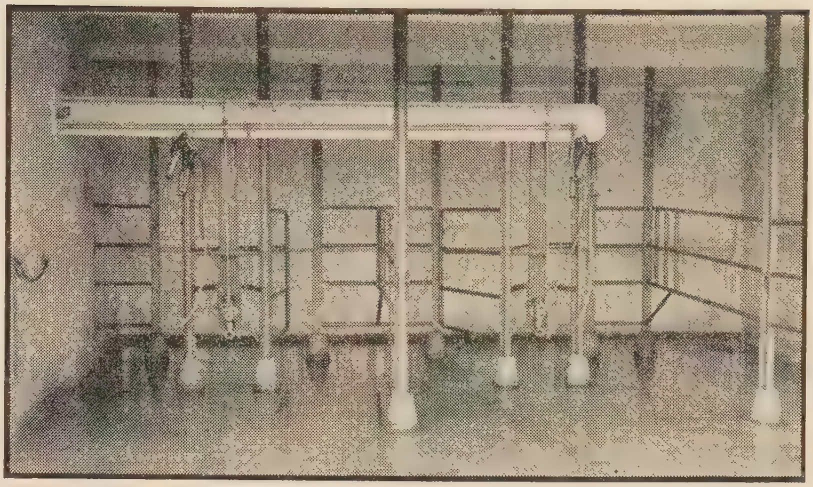


Used railway iron and second-hand 1in. steam pipe were used in the construction of this shed, the joints being welded. It has a sprinkler pipe on the rear wall, and the ceiling is lined.

caustic soda solution at least once a month in order to remove fat and, perhaps more important, to kill bacteria which have not been removed by the normal cleaning practices.

Strainers

Some people think that a strainer will remove any dirt which enters the milk. Bacteria are usually associated with dirt, and in the process of straining some dirt is dissolved and with the bacteria passes through the strainer. The finest strainer cannot catch the organisms which are responsible for most of the defects in milk. The only satisfactory method is to prevent the dirt and bacteria from entering the milk, and the place to do this is in the milking shed.

A strainer with a cottonwool wad, which is destroyed after milking, is sometimes used. Others prefer a fine wire-mesh metal strainer. If a cloth strainer is used, it is absolutely imperative that it be boiled after each milking, as a dirty strainer is worse than none. The procedure recommended is to take 2 freshly boiled cloths to the shed at the evening milking; the one used at night should be washed and soaked, and in the morning the clean one should be used. Both cloths should be taken to the house to be boiled and hung up to dry and it is not sufficient to wash them in hot water at the shed. If a farmer is not prepared to do this, he should not use a cloth strainer at all.

Milk Cooling

All the precautions up to this stage of production may be in vain unless the milk is cooled thoroughly and immediately after milking. Effective cooling and aeration results in greatly improved flavour and keeping quality and the prevention of heavy losses through souring. Cooling should always be done in a clean atmosphere to avoid the absorption of unpleasant odours and contamination from bacteria from dust, etc. It is obvious, therefore, why the milking shed, dairy, yard, and surroundings should always be maintained in a sanitary condition.

The number of bacteria found in milk depends on the number gaining access to the milk, the rate at which they multiply, which depends on the temperature, and the age of the milk (particularly under conditions favouring bacterial growth).

Cooling does not destroy bacteria; it merely retards or checks the rate of multiplication. Bacteria must be kept out of the milk by clean milking of healthy cows and by using sterilised utensils. If these fundamental precautions are neglected, it is likely to result in the presence of organisms in the milk which multiply at comparatively low temperatures and produce off flavours. Some types of bacteria lie dormant at low temperature, but as the temperature rises their activity increases.

Neglect or delay in cooling is accompanied by an increase in bacterial growth, indicating that the secret of efficient cooling is to cool the milk effectively immediately after milking and maintain the temperature as low as possible until the milk reaches the treating house or the consumer. These provisions apply equally for milk intended for pasteurisation.

In those localities where milk is taken to a balancing station (a cheese factory or a milk depot) to be chilled by refrigeration and forwarded to a city for pasteurisation there is a danger, if the milk has not been cooled on the farm, that certain milk-souring bacteria will be multiplying extensively by the time the milk reaches the balancing station, in which case the chilling of the milk only increases the heat resistance of these bacteria and pasteurisation may not destroy them. In that event the keeping quality of the pasteurised milk is affected.

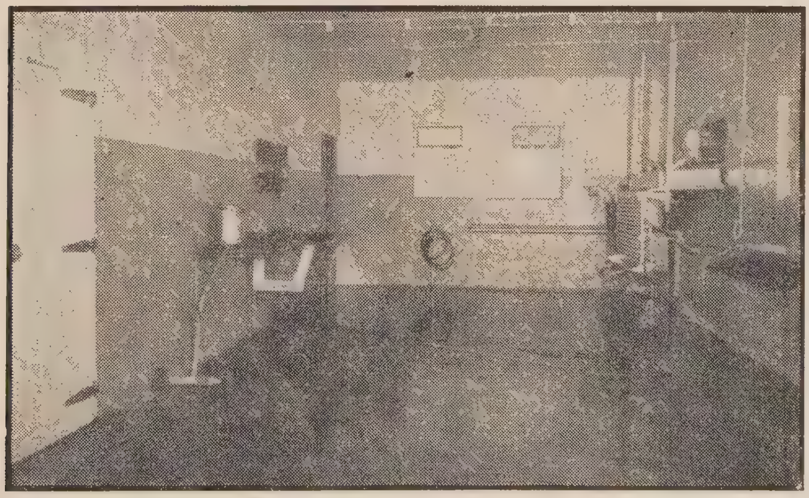
Size of Cooler

The washboard-type cooler, with artesian water as the cooling medium, is most commonly used in New Zealand. The size of the cooler depends on the number of cows milked at one time. Too often a small cooler is found to be the cause of ineffective cooling. It is advisable to have a cooler of approximately the following dimensions:—

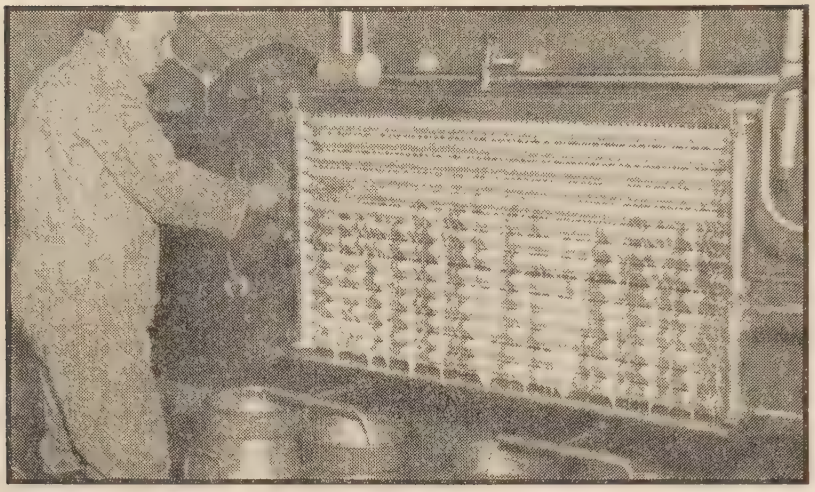
Plant		Length in.	Overall height in.	Tubes preferred
2-cow	..	36	19	11
3-cow	..	42	19	11
4-cow	..	42	24	13

The cooler should be connected to the water supply by a ¾in. pipe coming direct from the water pump and should not first pass through a tank even though, as is sometimes argued, the tank is emptied first. The temperature of the water rises on its journey through the tank and the coldest water is needed for good results.

When connecting the water to the cooler a bypass or pressure valve should be placed on the delivery side of the pump to avoid the possibility of bursting the cooler. The water inlet should always be at the bottom of the cooler and not, as has been noted sometimes, at the top. When the water



Interior of modern dairy, showing door of chilling room on left and trolley for loading cans.



Spreading milk over a cooler with a sterile brush; note the receiving vat and arrangement for equalising quality of milk flowing into four cans.

inlet is at the bottom of the cooler the coldest milk as it leaves the cooler passes over the coldest water as it enters the cooler, and, further, the cooler barrels must necessarily be full of water and not partly full.

A milk vat should be placed above the cooler to act as a hopper so that the flow of milk can be regulated. A slow, even flow is most essential. The more water flowing through the cooler and the less milk flowing over it the better the cooling. By regulating the flow of milk so that there is a ratio of milk to water of 1:4 the temperature of the milk is often brought to within 2 degrees of the temperature of the water. The milk should be spread over both sides of the cooler so that it flows in a thin film. If it runs back into little independent streams either the cooler is not level or it is not clean. As a precaution the water should be turned on a few minutes before cooling begins to ensure that no leak has developed in the cooler. The construction of the bottom tray should be such that several cans can be filled at the same time so that the tests of all cans are, as far as practicable, identical.

Special attention must always be given to washing the milk cooler, because it is one of the most difficult utensils to keep thoroughly clean and the cleanest milk is readily contaminated by a dirty cooler. The back of the cooler, under the tubes, and the corners are places requiring close attention.

Refrigeration

In some localities where the water supply for cooling milk is unsuitable and the farmer has to depend on the town main, for example, it is necessary either to have the milk collected twice daily or to have mechanical refrigeration installed. In all cases where a farmer contemplates installing a refrigeration unit he would be well advised to contact the Inspector of Stock or Dairy Inspector for his district, as certain conditions and formalities must be observed.

If the milk is collected from the farm once daily, the lids of the cans containing the night's milk should not be placed tightly on the cans until just before collection in the morning, and milk awaiting collection requires to be kept in a cool, shady place, preferably in the dairy.

Cows should not be milked longer than to within 8 weeks of calving, and the milk of cows milked once daily should not be used. Neither should night's and morning's milk be mixed, as the two are frequently of different temperatures.

Consumers in New Zealand have a right to expect that milk will remain sweet and wholesome in the home for at least 24 hours in summer and for 2 to 3 days in winter; but responsibility for achieving this end rests as much on all who handle the milk after it leaves the producer (to see there is no delay or neglect in transport, treatment or distribution, or in storage by the consumer) as on the farmer.

Probably some readers of this article will have concluded that the procedure set out could not be followed on the average dairy farm supplying the town. Such is far from being the case. Many town milk producers throughout New Zealand have become so accustomed to doing these things that they perform their routine tasks conscientiously and efficiently. On these farms one never sees a neglected cowyard, never a speck of dirt on the plant, never a hungry cow. Everything is done methodically and that is why these farmers have leisure time to enjoy. The most successful farmers are those who make careful plans well ahead and put those plans into execution in a methodical and intelligent manner.

Many aspects of production have been dealt with in detail. In producing milk for town supply a farmer must always pay particular attention to every detail, as careless methods at any stage will be reflected in a lowering of the quality of the milk.

Emphasis has been laid on the need for maintaining a low bacterial count. The producer of high-quality milk is in constant conflict with bacteria, which are so small that they can be seen only through a microscope. If bacteria were as big as flies they would present no difficulty, but though they are minute their importance cannot be over-estimated.

There is nothing alarming about the procedure which it is so necessary to observe in the production of a wholesome milk supply for town requirements. Advice on pasture management, conservation of suitable and sufficient kinds of feed, management of the dairy herd, and dairy technique generally is always available from officers of the Department of Agriculture.

METEOROLOGICAL RECORDS FOR JANUARY

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	201	64.4	— 0.7	85.2	45.0	0.63	4		0.23	18	274.5
Auckland	160	67.4	+ 1.0	80.1	54.8	0.60	5	— 2.51	0.25	28	295.0
Tauranga	10	66.0	+ 1.4	85.2	45.8	0.62	11	— 3.49	0.34	28	304.9
Ruakura	131	62.2	— 1.6	83.9	38.0	0.95	8	— 2.78	0.32	27	315.3
Rotorua	980	63.3	+ 0.4	85.0	41.0	1.64	7	— 2.74	0.91	28	307.9
Gisborne	12	65.2	— 0.6	92.2	45.7	3.89	13	+ 0.44	1.13	21	284.7
New Plymouth ..	160	62.8	+ 0.1	78.2	44.1	0.92	8	— 3.59	0.20	10	315.0
Napier	5	66.6	+ 1.1	90.7	48.0	1.27	7	— 1.39	0.45	20	292.2
Taihape	2157	58.8	— 0.4	80.0	40.3	1.88	13	— 1.43	0.77	15	
Wanganui	72	63.6	+ 0.3	82.2	47.2	0.95	8	— 1.94	0.31	29	292.8
Palmerston North	110	62.0	— 0.6	79.0	43.5	2.77	13	— 0.18	0.60	14	246.7
Waingawa	350	62.4	+ 0.0	85.5	39.5	2.25	12	— 0.28	0.68	15	259.0
Wellington	415	60.8	— 0.4	76.5	48.1	1.01	10	— 1.97	0.31	27	260.5
Nelson	24	63.5	+ 0.7	78.6	45.3	1.19	8	— 1.81	0.34	13	301.7
Blenheim	12	63.3	— 0.7	86.7	40.7	1.21	6	— 0.53	0.72	22	316.4
Hokitika	12	57.9	— 0.2	69.4	40.7	11.69	17	+ 1.58	1.91	7	205.6
Hanmer Springs ..	1225	59.2	— 0.7	82.0	36.5	1.75	10	— 1.92	0.61	13	234.5
Christchurch ..	22	62.5	+ 1.0	88.5	45.7	2.52	9	+ 0.32	0.68	29	238.7
Ashburton	323	60.4	— 0.2	84.8	42.0	2.68	8	+ 0.11	1.06	28	203.1
Timaru	56	60.6	— 0.1	82.0	41.4	1.79	5	— 0.59	1.05	10	205.6
Alexandra	520	63.4	+ 1.8	90.7	39.2	1.58	6	— 0.18	1.06	10	224.4
Taieri	80	58.7	+ 0.9	86.4	37.4	3.38	15	+ 0.86	1.26	10	196.0
Invercargill ..	32	58.2	+ 1.3	86.0	35.0	4.51	18	+ 0.47	0.88	25	196.7

PASTURE AND CROP PRODUCTION

SEASONAL NOTES Contributed by the EXTENSION DIVISION

EARLY autumn topdressing increases pasture production in the low growth period of the late autumn, winter, and early spring and thus helps to raise winter carrying capacity. Trials carried out by the Division over a long period of years have shown that while there is little difference in total annual production from applications of superphosphate at different times of the year, the season at which increased growth takes place does vary according to the time of application.

* * *

TIME TO APPLY SUPERPHOSPHATE

The response from superphosphate is usually evident about a month after application, if growth conditions are favourable, and it exerts its maximum effect in 2 to 3 months. Data from Divisional trials on time of application of superphosphate show that March and November-December applications are the most efficient in increasing pasture production at the low growth periods of winter and summer, that June and September dressings are least efficient, for with June applications the response is delayed for 2 or 3 months, and as for the September applications they increase grass production at the period of maximum growth when the extra feed is not particularly required.

* * *

TIME TO APPLY BASIC SLAG

Trials at the Marton Experimental Area with applications of basic slag in March, June, September, and December have given somewhat similar results to those outlined for superphosphate, except that basic slag showed its effect about a month after superphosphate and the differential effect from applications at various times of the year was less pronounced.

* * *

TIME TO APPLY LIME

Except on soils with a very high lime requirement there is generally no immediate response following a lime application. In a detailed trial at the Marton Experimental Area, which investigated the frequency of application of lime, it was found that the greatest response frequently occurred in the second year after application, particularly with heavy dressings. The season of the year at which lime is applied to pasture appears therefore to be of comparatively small importance, except in relation to applications of superphosphate to very lime-deficient soils, where liming should precede the application of superphosphate.

* * *

RESPONSES FROM LIME

Measurement and observational trials throughout New Zealand have shown that the greatest response to lime is frequently seen in dry summers and autumns. Occasionally, in spring, the production from "lime" plots has fallen behind that from "no lime" plots, but as this effect is usually most pronounced in periods of greatest pasture production, it is of little moment compared with the stimulus to growth in summer and autumn, when any improvement in pasture production is vital. On soils giving marked lime responses, however, it is not uncommon for such responses to be pronounced at all seasons of the year.

Early autumn topdressing increases pasture production in the low growth period of the late autumn, winter, and early spring and thus helps to raise winter carrying capacity.

WHEAT

Seed-bed preparation for winter wheat should be proceeded with as prior crop and soil conditions allow. The aim should be to secure a seed-bed with a rubbly surface and with the fine soil worked to the bottom through frequent use of grubber and harrows. Locality preferences for the various wheat varieties are now fairly well defined. Cross 7 is the most widely grown variety because of its good yielding and direct-heading qualities on average-to-good wheat lands. In the North Island it is found in the Hawkes Bay-Wairarapa area and on the heavier land of the Rangitikei where Tainui is subject to lodging. It is grown in the Nelson and Marlborough Provinces and also in Central and South Otago and in Southland almost to the exclusion of all other varieties. In Canterbury Cross 7 holds pride of place on the medium-to-good wheat lands. The growing of Dreadnought is chiefly confined to specific areas of extremely good soil type. Under these conditions it is an excellent yielder, but it has the disadvantage of shaking badly and therefore is not suitable for direct heading. It may be grown with success on the richest wheat-growing soils of Canterbury and particularly the Waimate-Waitaki area. There has been a tendency to replace Dreadnought with Cross 7 on these heavier lands, but Dreadnought gives higher yields and also supplies valuable wheat straw.

* * *

OTHER WHEAT VARIETIES

Fife Tuscan is the variety recommended for the lighter wheat land and accordingly it is to be found being grown on the lighter lands of Canterbury. Tainui is grown mainly in the North Island. It has been found to be the variety best suited for spring sowing in the Rangitikei-Manawatu area and also for late spring sowing on the good land surrounding Masterton. Some areas of Solid Straw Tuscan and Hunters are still grown, but Solid Straw Tuscan has been largely replaced by Fife Tuscan, while Dreadnought can be expected to give better results when grown under comparable conditions with Fife Tuscan. Hilgendorf is a new variety of wheat recently released from the Wheat Research Institute and has yet to find its real place in New Zealand's wheat-growing areas. It is a wheat of high baking quality and in the yield trials carried out it seems to compare satisfactorily with Cross 7, though it does not appear to be as suitable for direct heading. Local instructors will readily advise farmers of the variety best suited to individual conditions.

* * *

AUTUMN GRASS Speed of clover strike is the index of successful pasture establishment. This in turn depends on the moisture content, fineness, firmness, and temperature of the seed-bed, and the depth at which the seed is sown. In dry districts the seed-bed for autumn grass shoud be prepared after a summer fallow to conserve moisture and to allow of early autumn sowing when the soil is warm enough for the clovers to strike and grow. The seed should be broadcast on a well-rolled surface, for without a firm seed-bed clovers will not strike. Drilling of clover and grass seed together tends to bury the clover seed too deep and to create too much competition between the vigorous grass and the slower-establishing clover. While lime may be applied at any time during the working down of the seed-bed the phosphatic fertilisers should be applied at time of sowing.

SHORT-ROTATION RYEGRASS With seed production as the main objective, short-rotation ryegrass should be sown in the early autumn at 25 to 30lb. per acre with 2 to 3lb. of white clover. This provides good winter feed and a satisfactory seed crop. As a constituent of permanent pastures the value of short-rotation ryegrass is its winter growth. Where this is particularly important, up to 15lb. per acre should be included in the general mixture, but where short-rotation ryegrass is merely replacing Italian ryegrass as a temporary element no more than 5lb. per acre should be sown.

* * *

PORINA DAMAGE During April damage by the subterranean grass caterpillar is liable to show up. The caterpillars, which are night feeders, can, if the infestation is heavy, cause great damage to pastures in a few weeks. If control measures are to be effective, they must be put in hand within 2 weeks of damage becoming evident. Information recently received from the Entomological Research Station, Department of Scientific and Industrial Research, Ashburton, shows that two treatments give very good control. The first consists of broadcasting a mixture of benzene hexachloride (BHC 666) at 3¼lb. per acre together with superphosphate at 1cwt. per acre. The second treatment, which is of use where it is not desired to apply superphosphate, consists of broadcasting benzene hexachloride at 3¼lb. per acre with bran at 30lb. per acre.

Fruit Crop Estimates for January, 1950

THE following estimates of the fruit crop for January, 1950, in 000's of bushel cases, are provisional and revised monthly for the period November to March and are summarised from information supplied by field officers of the Horticulture Division, Department of Agriculture.

FRUIT	DISTRICT									
	Auckland	Gisborne	Hawkes Bay	Manawatu Wanganui	Wairarapa	Nelson	Marlborough	Canterbury North Otago	Central Otago	Total
APPLES—										
Ballarat	57	10	92	1	1	5	3	7	—	176
Cox's Orange Pippin	8	4	83	1	1	116	14	17	3	247
Delicious	38	11	112	1	5	180	13	18	21	399
Dougherty	21	5	72	—	—	24	1	—	—	123
Granny Smith	69	3	85	2	2	68	1	2	1	233
Gravenstein	26	—	35	—	—	49	1	—	—	111
Jonathan	11	—	50	—	1	259	22	12	6	361
Sturmer	6	5	200	5	15	325	24	49	12	641
Other varieties	103	6	171	3	5	138	12	51	12	501
Total	339	44	900	13	30	1164	91	156	55	2792
PEARS—										
Beurre Bosc	3	—	2	—	—	5	—	—	—	10
Louise Bonne de Jersey	1	—	10	—	—	—	—	—	—	11
Packham's Triumph	6	—	3	—	—	1	—	—	—	10
P. Barry	2	1	8	—	—	2	—	—	—	13
W. B. Chretien	10	—	40	—	—	20	—	2	8	80
Winter Cole	1	1	30	—	1	31	1	7	2	74
Winter Nelis	—	1	30	—	—	7	—	2	5	45
Other varieties	13	1	8	1	—	8	—	5	3	39
Total	36	4	131	1	1	74	1	16	18	282
OTHER FRUITS—										
Peaches	60	6	166	—	—	32	—	4	45	313
Apricots	1	—	4	—	—	—	—	5	69	79
Nectarines	1	—	14	—	—	1	—	—	9	25
Plums	33	5	32	1	—	3	—	3	20	97
Cherries	—	—	1	—	—	—	1	3	10	15
Quinces	9	—	7	—	—	4	—	—	—	20

Radio Broadcasts

THE following radio talks will be given to farmers from Station 1YA Auckland at 7.15 p.m.:—

April 12—"Current Farming Problems for the Month," by A. J. Kerse, Fields Instructor, Department of Agriculture, Auckland, and H. Woodyear-Smith.

April 19—"Winter Pasture Management," by G. A. Blake, Instructor in Agriculture, Department of Agriculture, Matamata.

April 26—Young Farmers' Clubs talk, by E. Rabbidge, Dominion President, Federation of Young Farmers' Clubs.

The following broadcasts will be made from Station 4YA Dunedin at 7.30 p.m. on the dates shown:—

April 5—"Tuberculosis in Cattle," by I. M. Cairney, Veterinarian, Department of Agriculture, Dunedin.

April 19—"Young Farmers' Clubs' Activities," by E. Rabbidge, Dominion president, Federation of Young Farmers' Clubs.

Other talks are given from 1YA Auckland on Tuesdays at 12.35 p.m., 2YZ Napier on Tuesdays at 7.10 p.m., 2YA Wellington on Thursdays at 12.35 p.m., and 3YA Christchurch on Mondays at 12.20 p.m.

Revised Lambing Estimate Figures

Slightly revised figures of numbers of breeding ewes in a few North Island counties since the lambing estimates were published in the January issue of the "Journal" have altered the Dominion estimate a little, as follows:—

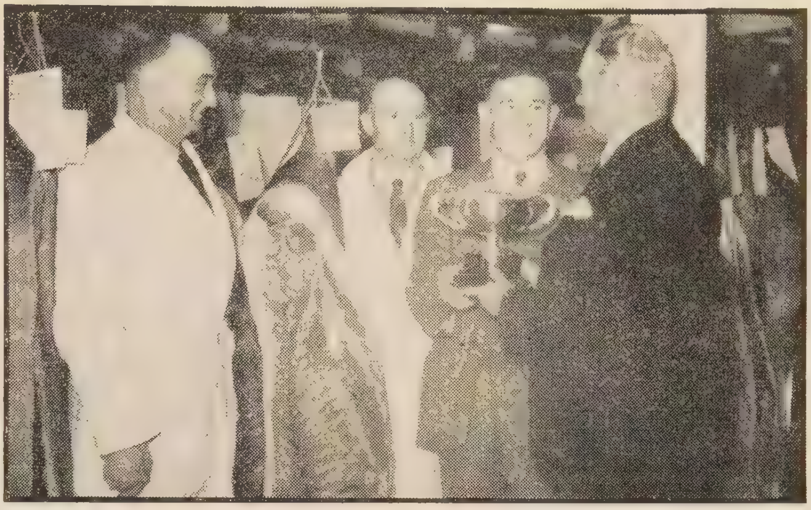
Dominion total of breeding ewes: 21,499,703 (instead of 21,505,369).

Estimated Dominion lambing percentage: 96.50 (instead of 96.48, which was the highest on record).

Pig Carcass Competitions for 1949 Reviewed

By A. LONGWILL, Superintendent, of the Pig Industry, Department of Agriculture, Wellington.

THE Dominion was well served in 1949 with pig carcass competitions. In addition to the Tomoana porker and baconer competitions, covering the whole of the North Island, and the Canterbury District Pig Council's bacon competition, numerous local competitions were conducted by other district pig councils and agricultural and pastoral societies. The standard system approved by the National Pig Industry Council for judging carcasses was used for judging on the hooks, and in a number of cases a further judging as cured bacon was carried out.



[*"Star-Sun" photo.*

The P.M.A. Challenge Rose Bowl for the best entry in the recorded section of the Canterbury District Pig Council competition being received by Mr. L. M. Ward on behalf of Lincoln College.

WHILE, on the whole, a high standard of quality was attained by the enthusiasts who continue to take part in these competitions from year to year, too many pigs were outside the most desirable weight ranges for the class. Competitors should aim to market their porkers as close as possible to the 80lb. mark and baconers at about 150lb. Where a team of, say, four pigs constitutes an entry, weights should be as uniform as possible. Experienced competitors who regularly send in entries of uniform weight and within the correct weight range start off with a considerable advantage.

Unfortunately, marketing conditions prevailing at present do not encourage producers generally to pay close attention to long-term quality requirements. Competitions help to keep the keener producers who take part in touch with these requirements, but they remain disappointed that there is no adequate commercial reward for their efforts to improve quality. If these producers insist on the early introduction of a commercial grading system which will provide the mainspring for improvement in carcass quality for the whole of the pig industry, they will not only reap the rewards due to them for their efforts, but be assisting to lay a solid foundation for future progress.

Competitions attract only about 1200 individual entrants, representing only the keenest 5 per cent. of pig producers. While the value of the competitions in maintaining interest is substantial, there can be no doubt that they would have a much wider effect if coupled with a commercial grading system which would provide incentive to a general improvement in quality.

Associated with most of the competitions to date there is a weakness that is probably inherent in the fact that pig production is, by and large, a minor part of the farm enterprise and little information by way of detailed records is kept by the producer. Accurate records of growth rate or food conversion are lacking—records which are essential for a fuller interpretation of the results in terms of carcass quality obtained under a thousand different sets of conditions on individual farms. Organisers of future competitions would be well advised to study this matter carefully. As pointed out when the previous year's competitions were reviewed ("The New Zealand Journal of Agriculture," October, 1948), the Canterbury District Pig Council has given a valuable lead in this direction, and the competition conducted by this council is reviewed below.

Canterbury Baconer Competition

A section is provided in the Canterbury baconer competition for pigs which are from recorded litters. All pigs are finally judged in the form of cured bacon (long sides) on a scale of points with a maximum of 100. In the recorded section a further 50 points are allotted for farm points on the following basis:—

			Maximum Points
Litter performance:—			
(a) Pigs weaned—1 point per piglet ..			10
(b) Litter weight 8 weeks—400lb. maximum (minus 1 point for each 10lb. under this to 300lb., then 2 points for each 10lb.)			20
Growth rate:—			
Daily gain from birth to slaughter of 0.75lb. dressed weight per day ..			20
Carcass quality:—			
Measurement points	Body length in relation to weight	20	
	Backfat thickness: Loin ..	20	
	Shoulder	10	
	Balance of side	5	
Eye appraisal:—			
Hams		15	
Fore-end (shoulders)		10	
Fullness of meat		10	
Marketing		5	
Belly thickness		5	
Total carcass-quality points		—	100
Total points, recorded section ..			150

Deductions of points for unsuitability of weight (to be made from individual carcass score):—

lb.	pts.	lb.	pts.
121-125	10	161-165	2
126-130	8	166-170	6
131-135	4	Over 170	10
136-160	0		

The system of pointing for carcass quality and deductions for unsuitability of weight is that which has been recommended by the Judging Standards Committee set up by the National Pig Industry Council. The amendments to the points system as compared with that of the previous year were as follows: —

(a) Backfat Thickness: Loin

This is taken in the same way and at the same place as previously, but the scale of points is altered to allow 1/16in. more fat throughout (e.g., while maximum points in the 151-160 range were previously given for 15/16in. the optimum thickness is now 1in. in this weight range).

(b) Balance of Side

Points allotted to this measurement have been reduced from 10 to 5.

(c) Belly Thickness

The 5 points made available by the deduction of points in (b) have been allocated on the appraisal, by touch and eye, of belly thickness. Previously no attempt had been made to assess this point, as it is known to vary greatly with the length of fasting, resting, etc., before slaughter. It is therefore impossible under the conditions of most competitions to ensure that the pigs entered are slaughtered after a uniform period of fasting. However, the point is an important one, and if it concentrates the attention of producers on the fact that thickness of belly can be greatly improved by fasting for 48 hours before slaughter, it may have beneficial results.

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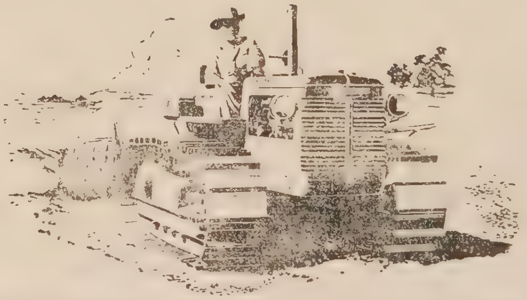

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POINTS SCORED BY BEST FIVE PIGS IN RECORDED SECTION

	First equal				Third		Fourth equal			
		Points		Points		Points		Points		Points
Number weaned ..	10	10	10	10	10	10	13	10	14	10
Litter weight (lb.) at 8 weeks ..	396	19	426	20	426	20	598	20	596	20
Daily gain (lb. dressed weight) ..	.70	18	.83	20	.76	20	.70	18	.87	20
Total farm points ..		47		50		50		48		50
Total carcass points		82		79		77		72		70
Total score		129		129		127		120		120

Where fasting is successfully carried out in Britain and on the Continent, however, ample yard space to allow fasting and resting is provided at the place of slaughter. It is doubtful whether equally good results could be obtained in any other way. Pigs fasted on the farm and then transported would be restless and tend to knock one another about, and increased bruising and injuries generally could easily offset any advantage of fasting in producing thicker bellies.

The correct method of approach would appear to be that of providing more resting space at the works, but this is not easy to achieve. It is further complicated by the large seasonal fluctuation in supply of pigs to the works and the incidence and effect of sale days as well as the 5-day working week.

Results of the Recorded Section

The P.M.A. Challenge Rose Bowl for the highest scoring pig in the recorded section was won by Canterbury Agricultural College, Lincoln. Two Lincoln Red pigs from different litters tied for this award.

The first four pigs whose score is shown in the table on this page were Lincoln Reds. The fifth was a B. x L.W. entered by Mr. S. Wall, Koiterangi. As was mentioned when reviewing this competition in an article, "Pig Carcass Competitions Help to Maintain Quality," in the October, 1948, issue of "The New Zealand Journal of Agriculture," the standard for growth-rate points could with advantage be raised to make it more selective. In this way the faster-growing pigs of the pairs which were first and fourth equal in the table on this page would secure the advantage they deserve.

Open Section of Competition

The open section was judged on carcass quality alone. Judging is finalised on the cured sides, using the table of points which was evolved for judging in the carcass form. This results in pigs judged under this system scoring more points for length, fat, and balance of side than when judged in carcass form. The score of the winning pigs in the competition is therefore higher than for those in competitions using the same system for pigs judged in the carcass form.

POINTS SCORED BY THREE BEST INDIVIDUAL CARCASSES

	1	2 equal	2 equal
Dressed weight (lbs.) ..	154	156	163
Body length ..	20	20	16
Backfat: Loin ..	18	20	18
Shoulder	10	10	10
Balance of side ..	5	5	5
Hams	12	11	14
Shoulders ..	8	6	8
Fullness of meat	8	7	8
Marketing ..	5	5	5
Belly thickness	5	5	5
	91	89	89
Breeding:	L.W. x B	L.R.	L.W. x B.

The first-prize pig was entered by Mr. M. A. Paterson, Koiterangi, one second equal by Canterbury Agricultural College, Lincoln, and the other second equal by Mr. E. G. Taylor, Takaka. Pigs of the same strains have performed well in previous competitions.

One of the pigs placed fourth equal was entered by Mr. S. Wall, Koiterangi, from a ton litter, carcasses from which, at 6 months, totalled 2570lb. or an average of almost 184lb. per pig.

It is interesting to note that no prize money is offered in the Canterbury competitions, which have now been operating successfully for 10 years. However, two trophies are competed for, a silver rose bowl presented by the New Zealand Co-operative Pig Marketing Association for the winning entry in the recorded section, and a challenge cup presented by T. H. Green and Company for the best individual carcass.

Further, the Canterbury District Pig Council awards certificates of merit in the case of all entries gaining 70 per cent. or more of the possible points and sends to each competitor a detailed report giving the points scored by all pigs in the competition. In this way it is hoped to give entrants some idea of where they stand and what are the weak points as well as the strong ones of their pigs and to give some indication of the capabilities of the various strains of pigs competing.

Tomoana Porker and Baconer Competitions

A new record was set in the Tomoana competitions with a total of 2040 porker and 2887 baconer carcasses on show in the three works in which

[*Sparrow Industrial Pictures Ltd. photo.*

The winning team in the North Island baconer championship, which was entered by Mr. T. W. Sewell, of Gisborne.

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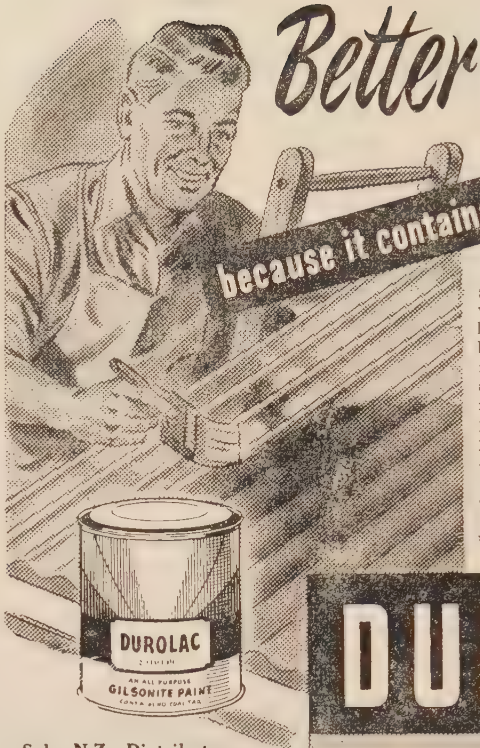

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the competitions are held. A team of four pigs constitutes an entry and judging is on the basis of the judging standards approved by the National Pig Industry Council, though, because of the numbers involved, it obviously cannot be carried out by one judge. The same panel of judges, however, does the final appraisal at each works and adjudicates on the North Island championships in both porkers and baconers.

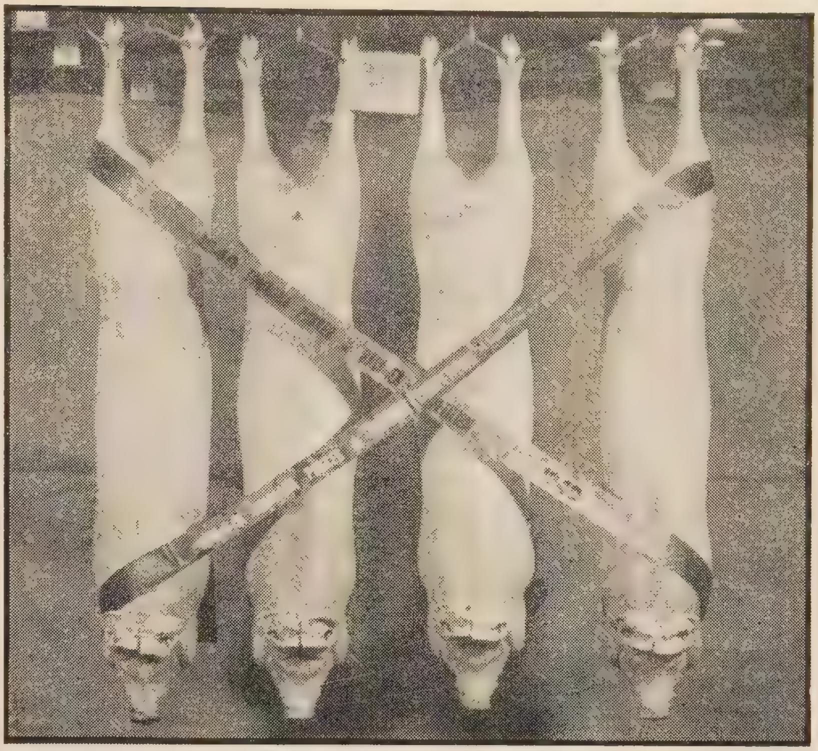
The porker judging standards are slightly different from those for baconers shown on page 273 in that the maximum points for loin fat are 15 and for marketing 10. Weight suitability for the trade is taken into consideration by application of deductions of points as set out below:—

lb.	pts.	lb.	pts.
61-65	5	91-95	2
66-70	2	96-100	5
71-90	0	101-120	10

In both porker and baconer sections of the competition further points are given for evenness of weight (10) and evenness of conformation (10) of the teams; thus the maximum points for any team is 420.

Mr. T. W. Sewell, Patutahi, Gisborne, secured the North Island baconer championship with a team of purebred Large White pigs which scored 355 points, which was 10 points better than the winning team in the previous year. Owing to minor changes in the judging system, it is not possible to compare the winning teams from year to year with complete accuracy.

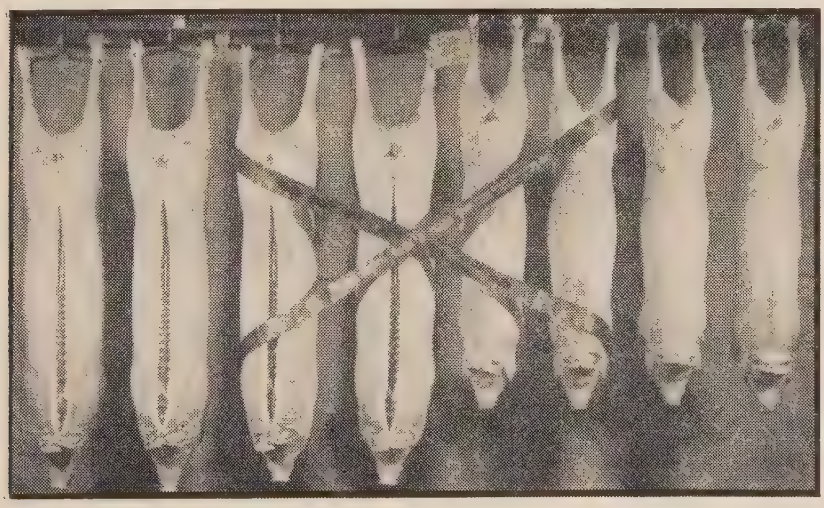
Mr. J. G. Fowell, Whitford, who was runner-up in the baconer championship with a Large White team scoring 344 points, was the most successful competitor in the whole series, winning the premier award in his district for both baconer and porker and, of course, combined teams and securing the North Island championships for both porker and combined teams. This team of L.W. x B. porkers scored 354 points, giving a total of 698 points for the combined team. This is 83 per cent. of the possible score and, as such, is highly creditable to Mr. Fowell.



[Sparrow Industrial Pictures Ltd. photo.

The team entered by Mr. J. G. Fowell, of Whitford, which won the North Island porker championship.

In a competition of this size there are many pigs of a high standard of quality, but the number of teams scoring 75 per cent. of the possible points or better and which could be classed therefore as outstanding is small. Thirty baconer teams and about double that number of porker teams come into this category. These 360 pigs represent only about 7.5 per cent. of the total entry. When this is divided between porkers and baconers, however, only about 4 per cent. of baconers are outstanding, while 12 per cent. of porkers come into this category. This indicates that the pigs produced in this country are on the whole still more suitable for porker than for baconer production.



[Sparrow Industrial Pictures Ltd. photo.

Mr. J. G. Fowell's combined team of porkers and baconers, the winning entry in the North Island championship for combined teams.

Particulars of Y.F.C. classes in this competition were published in the Y.F.C. Supplement to the "Journal" for September, 1949.

The prominence of the Large White breed among the outstanding pigs continues to be as marked as in previous years. Crosses of this breed with Berkshire and Tamworth x Berkshire sows also gave outstanding results.

Report on Selected Carcasses

Fifty of the prizewinning carcasses were exported as a special parcel for curing by the Empire Bacon Company, Newcastle-on-Tyne. The report on these carcasses, recently to hand, is very complimentary and confirms the results of judging as carcasses in New Zealand.

New Section in 1950 Competition

The sponsors of the Tomoana porker and baconer competition, W. and R. Fletcher (N.Z.) Ltd., have decided to introduce a new section into the 1950 competition. Under this special prizes will be given on the basis of combined score for growth-rate and carcass-quality points. For this it will obviously be necessary to have a record of the breeding and the date of birth of the pigs entered, and those competitors who normally keep these records will find a great deal of interest in checking up on carcass-quality characteristics in conjunction with growth rate. The best pigs, if not grown reasonably quickly so as to be profitable to the producer, are a liability and will not be produced indefinitely. The coupling together of carcass-quality and growth-rate points will help to direct attention to pigs which are profitable on the farm. While producing at least a satisfactory carcass according to commercial grading standards, the pigs will have grown reasonably quickly.

In this new section 100 points will be allocated to growth rate, with the maximum given to pigs growing at an average of 1lb. dressed meat gain per day or better, and points scaling down so that no points are given below ½lb. carcass gain daily. The maximum points per team in this class will be 520 and any teams scoring 400 points or better can be regarded as being the outcome of careful breeding and good husbandry.

Local Competitions

Many agricultural and pastoral societies have carried through the pigs from the commercial classes at their shows for judging on the hooks on the national judging standards and in at least two cases, Hamilton and Whangarei, final judging as bacon has been carried out. These local competitions, although small individually, are of the utmost value, as they provide the best opportunity for a large number of producers, in the aggregate, to see the carcass or final bacon side which represents the fruits of their efforts and to discuss its merits with carcass judges who, while knowing the requirements of the trade, also appreciate the problems of the producer. It is hoped that fuller use will be made of the local competitions. Purebred breeders can do themselves and the industry good by submitting some of their stock to test through these competitions. By this inclusion of growth-rate points together with those for carcass quality a sounder basis for estimating the true value of the performance will be provided and all those concerned with organising such competitions should give thought to this aspect in the future.

MOST farm children object to being confined to the back yard, but they should be discouraged from playing about the implement sheds and around sheep dips. Especially is this true for the younger members, who, being devoid of fear, take risks that older children will avoid. This little chap is happily playing with his toys, but he is in imminent danger of being run over by the truck as it is backed out of the shed, for because of the size of the tray he is not visible from the driver's seat. However, the responsibility is not with the child but with the driver, for no machine should be moved until the driver is sure that the way is clear for it, whether it be moved forward or backward. Where the vision is obscured additional care is necessary, and doubly if children are in the habit of playing about the farm sheds. A two-year-old child was killed in this manner only a few months ago.

—*C. J. CROSBIE, Farm Machinery Instructor,*
Department of Agriculture, Christchurch.

Mr. J. E. McIlwaine New Director of Livestock Division

THE new Director of the Livestock Division, Department of Agriculture, is Mr. J. E. McIlwaine, formerly Assistant Director. He succeeds Mr. W. C. Barry, who retired at the end of last year.

Mr. McIlwaine graduated from the Royal College of Veterinary Surgeons, Dublin, in 1921, after a brilliant career which included the award of the Walley Memorial Prize. This award is made each year through the Royal College of Veterinary Surgeons to the student who in the written portion of the third professional examination obtains the highest aggregate of marks of candidates from all the veterinary colleges of Great Britain and Ireland.

[*S. P. Andrew Ltd. photo.*
Mr. McIlwaine.

Mr. McIlwaine joined the Department in 1925 after four years' private practice in Great Britain. After a year in Dunedin he was transferred to Wellington and at the end of 1926 was moved to Manawatu for a season's meat-inspection work. On his return to Wellington in 1927 he was engaged principally in port and quarantine work, field duties, and tuberculin testing of town-supply herds. He was also associated in the control and eradication of an outbreak of swine fever.

After a short time as acting Superintendent at Wellington Mr. McIlwaine was transferred to Palmerston North as Veterinarian in 1935, and in 1937 he was appointed District Superintendent, Wellington. As Assistant Director since 1938 he has been closely associated with all aspects of the administrative work of the Division.

◆

SHOW DATES

April 1—Flaxbourne A. and P. (silver jubilee show) at Ward.
April 1—Waverley A. and P. at Waverley.
April 1—Oxford A. and P. at Oxford.
April 10—Strath Taieri A. and P. at Middlemarch.
April 10—Mackenzie County A. and P. at Fairlie.

◆

Spring-flowering Subjects to be Planted Out

WITH the first autumn rains, and immediately after the soil has become thoroughly moistened, opportunity should be taken to plant out into their flowering quarters such spring-flowering subjects as primroses, polyanthus primroses, wallflowers, myosotis or forget-me-nots, daisies *(Bellis perennis)*, aubrietia, and winter-flowering pansies and violas. Advice on that and other work is given in this month's notes for the flower gardener by M. J. Barnett, Director of Reserves to the Christchurch City Council.

THOUGH in favourable districts the so-called winter-flowering pansies and violas will flower throughout the winter, they will not bloom freely in the colder localities, but if well-grown plants are established before winter, they will produce a wealth of flowers from August until November even in districts where winters are severe. Other plants which may also be planted out to advantage now are Iceland poppies, Canterbury bells, foxgloves, and sweet william.

Preventing Damage by Sparrows

The ubiquitous sparrow all too frequently attacks the tender young leaves of the Iceland poppy, severely and sometimes fatally injuring the young plants. From observations made, it appears that only during autumn, winter, and early spring, when the plants are tender, do the birds seem to destroy them out of pure mischief, but a careful inspection of the plants often reveals little colonies of greenfly nestled on the undersides of the leaves. Possibly the sparrows, in their search for food at a time of year when little seed (their natural food) is available, turn to the greenfly to satisfy the pangs of hunger. Obviously, the easiest way to obtain them is to pluck the leaves and crush the insects with their bills, which are specially adapted by nature for this purpose. The same thing applies to primroses and polyanthus primroses, but in these cases it is the flower buds that are destroyed.

Strands of black cotton or thread fixed to short, inconspicuous pegs will prevent such damage. To be effective the strands should not be high enough above the ground to allow the birds to pass underneath without touching them. Apparently when the birds alight on the ground and hop toward their victims they either see or touch the cotton, which frightens them off. One strand on either side of the plants usually is sufficient, but a third strand slightly higher and directly above the plants makes doubly certain.

Planting and Transplanting

Though such subjects as Canterbury bells, foxgloves, and sweet william do not flower until early and mid-summer, they succeed and flower better if planted out in early autumn and well established before winter than if their planting is delayed until spring. In fact, this rule applies with equal force to many of the herbaceous perennial and alpine plants. If the ground is vacant and the soil prepared, opportunity should be taken in April to plant out most hardy plants rather than delay such work until spring.

The pruning or trimming of evergreen hedges should be completed by early autumn because cutting such plants in winter leaves open wounds exposed to cold winds and frost.

Many of the herbaceous perennials may also be divided and transplanted now. The peony is a case in point. As a rule it is somewhat difficult to transplant or, as professional gardeners say, it is impatient of root disturbance, and will take a year or more to recover from the check it has received. Some gardeners prefer to wait until spring when fresh growths are starting to develop before moving it, but experience has shown that it can be divided and moved with greater impunity in early autumn.

In the warmer coastal districts where few severe frosts are experienced such half-hardy plants as *Primula malacoides* and cinerarias can be planted out for providing colourful displays during late winter, spring, and early summer. Both plants succeed better in sheltered positions where they are not exposed to the full glare of the sun. Cinerarias especially are excellent for planting among shrubs or underneath trees, which provide additional protection.

In mild districts the calendula or Scottish marigold is an excellent subject for winter and spring flowering. However, for this purpose the plants

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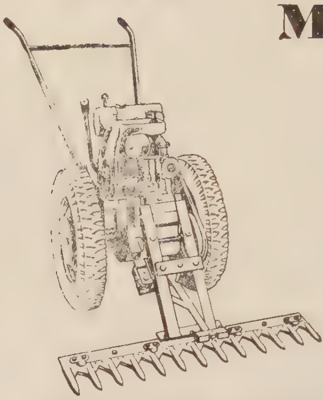

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[*Douglas Elliott photo.*

The aconites or monk's-hoods, tall herbaceous perennials, are eminently suitable for planting in groups in a herbaceous border or for naturalising in a wild garden. The flowers are a deep, rich blue and at first glance are not unlike those of the delphinium, but closer inspection shows that the florets are hooded, in shape not unlike the hood or cowl worn over the head by monks of old. There are several species of the aconite, but the three most popular for the garden are *Aconitum fischeri* (above), *A. napellus*, and *A. wilsoni*. All of them grow best in a deep, rich soil. *A. napellus* begins to flower first after Christmas and *A. wilsoni* a little later, but in both cases if the main flower heads are removed as they pass to seed, the lateral growths will develop and continue flowering into autumn. *A. fischeri* is an autumn-flowering species which blooms later than the other two. The tuberous-like roots of the aconites are highly poisonous and could be mistaken by the unwary for artichokes. The plants are completely deciduous and in winter, when there is little above ground to indicate their presence, care should be observed during digging operations not to disturb the resting tubers unduly.

should be well forward in growth and should be planted out in the open as early in autumn as possible to enable them to become well established before the colder weather sets in.

For late-spring and early-summer flowering antirrhinums may also be planted.

The planting out of bulbous plants should be expedited as much as possible. Where of necessity the bulbs of narcissi, hyacinths, and tulips will not be planted until May, the bulbs should be examined. All those showing the slightest sign of decay should be destroyed or at least separated from the sound bulbs to prevent the infection spreading. Where a considerable number of bulbs must be handled they should be spread out in shallow trays and kept in a cool, airy place rather than stored in bulk in a confined space. If greenfly attacks the shoots developing from the sprouting bulbs, it must be immediately destroyed with one of the approved insecticides.

Rock Gardens

During April the rock garden should be overhauled completely. Except where seed is required, all seed heads and old flower heads should be removed. Many of the cushion-like mats of glaucous-grey foliage on the dwarfer dianthus or rock pinks look attractive throughout the winter, but too often their appearance is spoilt by the presence of old, bedraggled flower stalks. If they are given a firm, sharp tug instead of being cut off, the stalks come away intact without leaving a stump which would detract from the effect desired.

All weeds and seedlings that have come up out of place must be removed before they obtain a good foothold. Strong and rampant-growing subjects which tend to encroach beyond their proper confines should be restricted. The aim of all cutting back is to foster and maintain a natural appearance and avoid formality.

Opportunity should also be taken to divide up and transplant existing plants where such work is called for and to plant out new plants that have been propagated or acquired. Such plants as the sempervivums and encrusted saxifrages often become so congested that it is necessary to lift the clumps, break them up, and replant them.

Some authorities recommend topdressing rock gardens in early spring. That is excellent advice, but some topdressing can also be carried out with advantage in autumn. The standard mixture for topdressing consists of clean soil, sharp sand, and leaf mould in equal proportions, with a little decayed cow manure added. Nevertheless, gardeners should make themselves familiar with the requirements of their rock plants and ascertain which are lime lovers and which lime haters.

Many alpine plants with woolly or down-covered leaves suffer severely during wet winters. In their native habitats such plants are often covered with snow during winter, or they grow on mountain sides where drainage is perfect and frequent breezes dispel moisture clinging to the leaves. Under

[*Douglas Elliott photo.*

Though several of the crab apples such as *Pyrus malus purpurea* and *P. eleyi* are valued for their wealth of bloom in spring, others are esteemed for their brightly coloured fruits in autumn. One of the best of these is *Pyrus malus* Gorgeous (above). In autumn this variety of hybrid, which may be grown as either a large shrub or a small tree, is generously covered with small, round, highly coloured fruits which remain on the tree for several weeks. An earlier-fruiting hybrid is John Downing, which has much larger fruits than Gorgeous and is also attractively coloured. The fruits of the hybrid make excellent crab apple jelly. All of the crab apples are perfectly hardy and will grow in almost any soil or situation.

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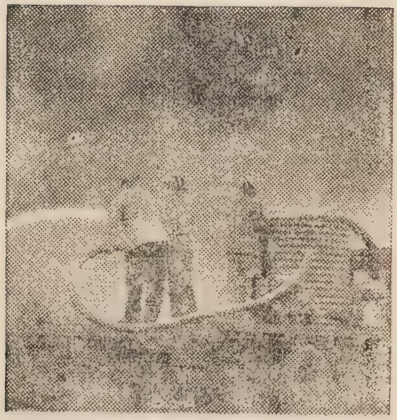

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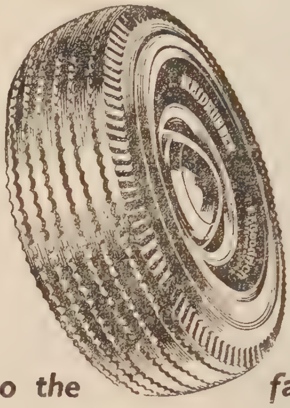

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For old-established lawns the blades of the mower should be raised ¼ or ½in. at this time of year so as not to cut as closely as in summer.

cultivation these conditions do not obtain, but it is the gardener's task to replace them as far as possible. Rock chips, sharp gravel, or ¼in. screening spread over the surface of the soil and worked among the foliage prevents it from coming into direct contact with the wet, cold ground. Some enthusiasts suspend or fix suitably sized pieces of glass over treasured subjects to protect the foliage from excessive wetness; the glass is removed with the advent of spring.

In a rock garden where the soil has become impoverished and worn out it is better to lift the plants, remove the soil from the pockets and interstices, and replace it with fresh soil or a mixture suitable for the class of plants to be grown.

Trimming Hedges

All evergreen hedges such as those of escallonia, olearia, laurel, holly, lonicera, and even the "macrocarpa" (*Cupressus macrocarpa*) should be trimmed immediately. Too frequently this work is left until winter when more time is available. If it can possibly be avoided, no evergreen plant should be pruned or cut during winter. Cutting such plants then leaves an open wound exposed to biting winds and frost. A flesh wound on the body, no matter how trivial, if exposed to the cold readily becomes a nasty sore difficult to heal. Cold and frost biting into the innumerable wounds made when trimming a hedge are the direct cause of the bleached, debilitated appearance that many evergreen hedges have during winter. In some cases frost damage is but the initial stage of more serious trouble. The injury provides a means of ingress for disease which may ultimately prove fatal.

Completing the pruning or trimming of evergreens by early autumn allows the wounds a reasonable chance of healing over before the harsh weather of winter sets in.

The damage done to deciduous subjects is comparatively small, as during winter the plants are dormant, the living tissues are inactive, and the sap flow has ceased or is considerably reduced.

Rolling and Cutting Lawns

Lawns sown last month should now be making good growth. When the young grass is a few inches high a light rolling benefits it, pressing the soil more firmly about the roots and causing the grass to tiller out—that is, to develop lateral or side growths at the bases, thus inducing the formation of a closer, more compact sward. Only a light roller should be used and only when the grass and surface of the soil are dry.

For old-established lawns the cutting blades of the mower should be raised ¼ or ½in. higher than usual so as not to cut as closely as in summer. This extra length or "knap" is necessary to protect the lawn from undue injury by severe frosts.

Compost Heaps and Bonfires

During April and May there will be abundant garden refuse for composting, such as fallen leaves, annuals and bedding plants cleared from the flower beds, the tops of dahlias, and spent growths from herbaceous borders. Arrangements must be made for its immediate disposal. It should not be added to the refuse that has been composted during the previous months; this can be removed from the bins, turned, and stacked for winter use.

The belief that any material that will rot should be composted is common, but among the refuse from the garden are materials which are better destroyed in a rubbish fire. Among substances which should be burnt are all plant growths infected with fungoid or bacterial diseases, such as virus, rust, and black spot; woody material which will not decompose readily; and any material containing or tainted with such poisons as old engine oil, kerosene, creosote, and weedkiller. The perennial roots of docks and the underground stems of couch grass will decay readily if placed in the centre of a compost heap, but much more heat than that generated in the heap is needed to kill the resting spores and infestations of most diseases.

Nevertheless, even these materials can be made to serve a useful purpose. As soon as the ash from a bonfire is cold it should be put into a container and stored dry until required. Such ash contains not only a fairly good percentage of potash, which is an essential plant food, but much of the mineral substance absorbed from the soil by the plant. It is frequently stated that the ash residue of the plant represents all the mineral matter absorbed by it from the soil, but quite probably the heat of the fire dispels in the form of gas at least some of the minerals absorbed in liquid form by the plant. However, the main point is that the heat of the fire destroys infectious diseases and poisonous substances, leaving an ash which when used with discretion is a valuable addition to the soil and the plants that derive their being from it.

Wood ash or ash from the rubbish fire is not beneficial but detrimental to some kinds of plants. Among these are all the ericaceous plants such as rhododendrons, azaleas, ericas and heaths, kalmia, andromeda, most lilies, and, in certain circumstances where the soil is naturally neutral or alkaline in quality, primroses and pansies. On the other hand, plants such as carnations and chrysanthemums appear to appreciate its presence in the soil.

Wintering Dahlias

When dahlias have been cut down by the first sharp frost the tubers should be lifted, the growths removed to within about 6in. of the crown, and the tubers stored for winter.

Various ways of storing the tubers are recommended, but the main points to be observed are to cover the tubers sufficiently to protect the eyes, which are close to and around the junction of the tuber with the stem, from penetrating frosts; to use material such as sawdust or light soil that will not absorb and retain too much moisture; and to inspect the tubers from time to time to see that they are not shrivelling from want of moisture.

WORK FOR THE FLOWER GARDENER

[*Douglas Elliott photos.*

Solanum crispum is a vigorous-growing climbing plant from Chile. It is perfectly hardy in most districts, is not particular about soil, and if given sufficient support will grow to a height of 20 to 30ft. For covering a wall quickly or screening some unsightly object it is an excellent subject. The flowers are showy and of a rich purplish-blue. The variety *autumnale* (left), as the name suggests, flowers during autumn and in mild districts even into early winter. *Solanum wendlandi* (right) is also a climber, but with much larger, handsome, lilac-blue flowers. However, it is a much more tender plant and is usually grown under glass, but it is grown successfully outdoors in sheltered positions in the warmer parts of the North Island.

In most parts of New Zealand dahlias may be wintered safely heeled in in a light, well-drained soil in a warm position which has the protection of a hedge or wall. If frosts severer than 12 degrees F. are to be expected, a light covering of straw or litter gives added protection. When heeled in in the open as recommeded the tubers should be laid slightly on their sides so that the stems are inclined away from the quarter from which rain is most likely to come. Moisture collecting in the hollow stems frequently sets up decay which eats down to the crown of the plant, destroying the dormant eyes or buds.

Except where the tubers must be lifted to make room for spring-flowering subjects, dahlias may be left in the ground undisturbed. Such varieties as Willie den Ouden and Golden Pheasant seem to do better when treated so than if they are stored each year. Where wet winters and very severe frosts are to be reckoned with it is safer to lift and protect all tubers.

Plants under Glass

Tuberous-rooted begonias which have provided the main display in a greenhouse and conservatory during the past few months will have almost reached the end of their usefulness and should be removed to make way for the cinerarias, chrysanthemums, and cyclamen which will be developing their flowers rapidly and will require protection under glass.

Water should be withheld from the begonias gradually until the stems ripen and drop away from the tubers. When the ripening has been completed the tubers should be removed from the pots, the soil shaken free from the remaining roots, and the tubers placed in shallow boxes or trays containing a mixture of sand and leaf mould (even pure sand will do) and stored for the winter in a warm, dry place. Care should be taken not to bury the tubers, the upper surfaces of which should be barely flush with the level of the soil or sand in the boxes.

Freesias and lachenalias which have been growing steadily in the frame should be brought into the greenhouse to receive more warmth to promote earlier flowering.

Late-flowering chrysanthemums will be showing colour rapidly, and to protect the vulnerable blooms from injury by frost overhead protection should be provided. When they are placed in the glasshouse the atmosphere should be kept as dry and as buoyant as possible by keeping water off the pathways and benches and by good use of the ventilators.

Plants to Propagate

To make a display in the garden and to provide cut flowers during November and December, hardy annuals which can be sown in the open toward the end of April include clarkias, larkspurs, godetias, cornflowers, and nigella. A warm, sheltered position in the garden should be selected and the seed sown where the plants are to flower.

Sweet peas may be treated similarly. If they are planted on the north side of a fence, they will receive all the protection they will require during the winter.

Marguerite and Chabaud carnations will give a much longer period of flower if the seed is sown now than if the sowing was delayed until spring. The seed should be sown under glass where an average temperature of 60 degrees F. is maintained. When the seed has germinated and the seedlings are large enough to be handled they should be pricked off into flats or trays in the same way as annuals are treated. When the plants have established themselves the trays can be moved to the protection of a cold frame, where they will remain until planting-out time in October. By January the plants will be in full bloom and will continue to flower freely until winter sets in.

Chinese Gooseberry RECIPES

COMING into season when other fresh fruit is scarce, Chinese gooseberries are a welcome addition to the winter menu, but as yet these sub-tropical fruits are not widely known in New Zealand and the question "How do you eat them?" is often asked. Home gardeners who grow the vines are likely to be confronted with a large crop and may be at a loss to make use of the fruit. In this article Eva Topping, Rural Sociologist, Department of Agriculture, Auckland, gives some recipes for desserts, pickles, preserves, and cakes made with Chinese gooseberries. The culture of the fruit is the subject of an article in an earlier part of this issue.

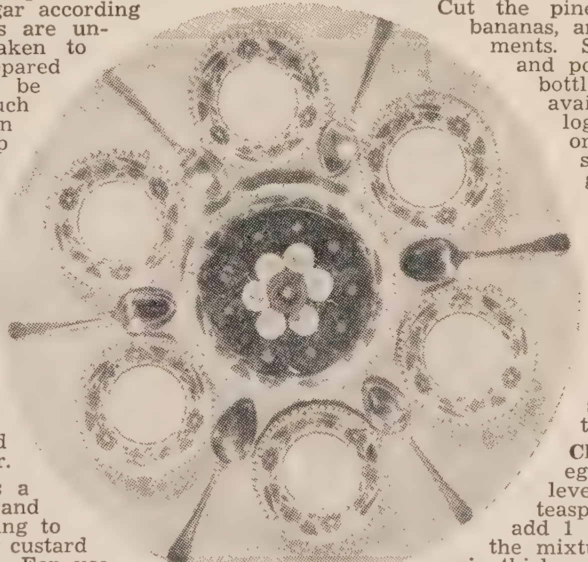
THE Chinese gooseberry is not ready to be eaten until it is soft, but it should not be over-ripe. It may be eaten fresh, cut in halves and scooped out with a teaspoon, with or without sugar according to taste. The stiff brown hairs are unpleasant, so care should be taken to ensure that none gets into a prepared dish. Much of the "fuzz" can be rubbed off with a coarse cloth, such as hessian, and the hairs are then less likely to get on to the pulp when the fruit is being peeled.

Chinese Gooseberry Desserts

For dessert, Chinese gooseberries are an asset in winter when other fresh fruit is scarce and the store of preserved fruit is diminishing. They may be served peeled and sliced, with lemon juice and sugar sprinkled over them and top milk or a cold, thin, pouring custard. Some people prefer these fruits served at breakfast time with salt and pepper rather than with sugar.

Chinese gooseberry pie makes a pleasant change from apple pie, and the fruit is also useful for stewing to serve for dinner with a junket or custard or for breakfast with a cereal. For use with jelly this fruit must be cooked first, as the raw fruit prevents the gelatine from setting.

Jewel salad: Chinese gooseberries are a valuable addition to winter fruit salads, for they are both pleasantly flavoured and decorative. The "jewel salad" in the illustration on this page is composed of fresh pineapple, bananas, bottled strawberries, oranges, and Chinese gooseberries. Cut the pineapple into chunks, slice the bananas, and break the oranges into segments. Squeeze the juice from a lemon and pour it over the fruit. Add the bottled strawberries if they are available; preserved raspberries, loganberries, very small red plums, or cherries can be used instead of strawberries. Slice the Chinese gooseberries and blend them with the other fruits, reserving sufficient slices to arrange on the top of the salad. If the fruits have not enough juice to make the required amount of syrup, boil 1 tablespoon of honey or sugar with 1 cup of water, cool it, and pour it over the salad. Leave the salad to stand for a short time before serving it to allow the flavours to blend.



Chinese gooseberry fool: Beat 2 egg yolks with a pinch of salt, 1 level tablespoon of cornflour, and ½ teaspoon of vanilla essence, gradually add 1 cup of scalded milk, and cook the mixture over boiling water until it is thickened; then stir in 1½oz. of sugar and cool it. Beat the 2 egg whites until they are stiff, then beat in another 1½oz. of sugar. Fold the egg whites into the cooled custard and add 1 cup of well-drained cooked Chinese gooseberry pulp.

[*Photographs on this page by Sparrow Industrial Pictures Ltd.*

CHINESE GOOSEBERRY RECIPES

CHINESE GOOSEBERRY PIE

Pile the sweet into a serving dish and garnish it with slices of uncooked Chinese gooseberries.

When it is available, ½ to 1 cup of whipped cream improves the fool if it is added after the egg whites have been blended with the custard.

Pickles

Chutney made from Chinese gooseberries gives variety to the pickles corner of the store cupboard, for it has a distinctive flavour and no spices other than ginger are combined with the fruits. It is specially suited for accompanying delicately flavoured meats such as cold veal or chicken. It may be used at lunch or as a spread for savoury sandwiches.

Chinese Gooseberry Chutney

- 12 Chinese gooseberries
- 3 medium-sized onions
- 1 lemon
- 2oz. of preserved ginger
- 1 teaspoon of ground ginger
- 1 small cup of raisins
- 1 dessertspoon of salt
- ¼ teaspoon of cayenne pepper
- 1 large cup of brown sugar
- 1½ large cups of vinegar

Peel the Chinese gooseberries and cut them into quarters, cut the onions into fine pieces, slice the lemon very thinly and discard the pips, cut the raisins in halves, and chop the ginger into small pieces. Put all the ingredients into a large saucepan and simmer them gently for about 1½ hours, stirring frequently to break them down to a pulp. Cool the chutney slightly and put it into small pots. Cover it well and store it in a cool place.

Pickled Chinese Gooseberries

- 2lb. of Chinese gooseberries
- 1 teaspoon of ground ginger
- 3 teaspoons of mustard
- 6 peppercorns
- 1 teaspoon of curry powder
- ¾ pint of vinegar
- 3 tablespoons of brown sugar
- 1 dessertspoon of salt

Peel the Chinese gooseberries, sprinkle them with the salt, and leave them to stand for a few hours. Boil the other ingredients for 5 minutes, add the fruits, and cook them until they are tender.

Chinese Gooseberry Sauce

- 3lb. of Chinese gooseberries
- 1lb. of sugar
- 2 pints of vinegar
- 1 teaspoon of cayenne pepper
- 1 teaspoon of ground ginger
- 1 teaspoon of cloves
- 1 teaspoon of peppercorns
- 2oz. of garlic

Peel the Chinese gooseberries and then boil all the ingredients together until they are reduced to a pulp. Strain the sauce through a coarse sieve and bottle it.

Jam

When the jam cupboard is becoming bare and refills are needed, use Chinese gooseberries. This winter fruit makes a good setting jam of attractive greenish-golden colour with a pleasant, distinctive flavour.

- 4lb. of Chinese gooseberries
- 3lb. of sugar
- 4 medium-sized oranges

Cut the Chinese gooseberries in halves and scoop out the flesh with a teaspoon. Put the fruit into a preserving pan with 2 cups of water and boil it until it is soft. Add the juice and grated rind of the oranges and the sugar. Boil the jam quickly until

MAKING CHINESE GOOSEBERRY CHUTNEY

[*Sparrow Industrial Pictures Ltd. photos.*

the setting stage is reached. Leave it to cool for a short while, stir it, and pour it into warmed jam jars.

Instead of the orange juice and rind, lemon juice only may be used, in the proportion of 1 lemon to every 1lb. of Chinese gooseberries.

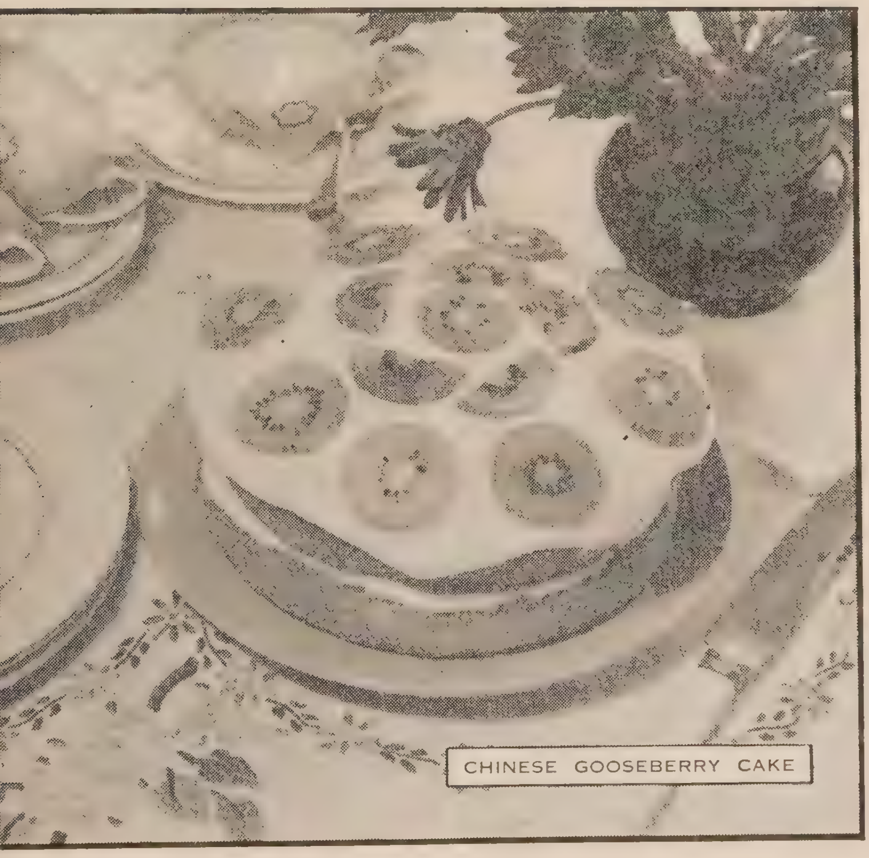
Bottled Chinese Gooseberries

If the store of bottled fruit is getting low and a little more is needed to tide the family over until the next fruit season, preserved Chinese gooseberries can fill the gap.

Method 1: Peel the fruits and cut them in halves, across or lengthwise as preferred, and pack them into clean jam jars. Make sufficient syrup (1 cup of sugar to 2 cups of water) and pour it over the fruit. Slip a thin-bladed knife down the sides of the jars to let out air bubbles. Cover them with skin seals, tied tightly. Set the jars on a rack, folded cloths, or newspapers in a container of water, having the level at least 1½in. above the tops of the jars. Bring the water slowly to boiling point, then keep it boiling for 15 minutes. Take out the jars and stand them on a wooden surface away from cold draughts to cool.

Method 2: Make a syrup of the same proportions as in the first method, bring it to the boil, gently put in the peeled and halved fruit, and boil it steadily for 15 minutes. Pack heated, sterilised jars with the fruit and fill them up with syrup to within ½in. of the top. Put on self-sealing lids and screw on the tops. Leave the jars undisturbed for 24 hours, then remove the screw caps and test the seals.

BOTTLING CHINESE GOOSEBERRIES



CHINESE GOOSEBERRY CAKE

Chinese Gooseberry Cake

For an afternoon tea party here is a cake that looks pretty and tastes delicious:—

2 eggs
1 teaspoon of baking powder
½lb. of flour
¼lb. of butter
¼lb. of sugar

Cream the butter, add the sugar while continuing to beat, add the eggs, then the sifted flour gradually, and with the last spoonful add the baking powder. Put the mixture into two well-greased and floured sandwich tins and bake it for 25 to 30 minutes in a moderate oven (360 degrees F.).

Filling: Mash uncooked Chinese gooseberries, sweeten them with icing sugar, and spread them between cooled layers of cake.

Icing: Cream 1 to 2oz. of butter and add 1 cup of icing sugar, beating them well. Add just sufficient colouring to tint the icing pale green and a little milk if necessary to obtain a spreading consistency. Smooth the icing on the top layer of the cake and decorate it with slices of Chinese gooseberries. The fruit should be peeled and cut with a stainless steel or silver knife or it will discolour.

Decorating Ice Creams and Sundaes

Slices of raw Chinese gooseberries are attractive if used on individual dishes of plain ice cream, and a Chinese gooseberry sundae makes a more special frozen dessert. Put a spoonful of thick, cooked pulp in a small glass custard cup or other sweet dish, cover it with a serving of ice cream, and sprinkle the top with small pieces of preserved ginger.

[*Sparrow Industrial Pictures Ltd. photos.*

A Hip-length Cardigan in Cable and Rib Stitch

THE hip-length cardigan the making of which is described below is suitable for either autumn or winter wear. It buttons up to the neck and is knitted in cable and rib stitch. The double cable patterns on the cardigan are divided by reversed stocking stitch.

THE materials required are 10oz. of 3-ply wool, 1 pair of No. 11 knitting needles, a spare No. 11 knitting needle for cable stitch, and 13 buttons.

The measurements are: Length from shoulder, 23½in., to fit a 34 to 36in. bust measurement; sleeve seam, 18in.

Abbreviations used are: K., knit; p., purl; sts., stitches; rep., repeat; tog., together; inc., increase; dec., decrease.

Back

Cast on 184 sts. and work in pattern as follows: 1st row: P. 4, * k. 8, p. 4; rep. from * to the end. 2nd row: K. 4, * p. 8, k. 4; rep. from * to the end. 3rd row: P. 4, slip the next 4 sts. on to the spare needle and leave them in front of the work. K. the next 4 sts., then k. the sts. from the spare needle (referred to as cable 8), p. 4, * k. 8, p. 4, cable 8, p. 4; rep. from * to the end. 4th row: As for the 2nd row. 5th row: As for the 1st row. 6th row: As for the 2nd row. 7th row: As for the 3rd row. 8th row: As for the 2nd row. Now rep. the 1st and 2nd rows twice more.

13th row: P. 4, k. 8, p. 4, * cable 8, p. 4, k. 8, p. 4; rep. from * to the end. 14th row: As for the 2nd row. 15th row: As for the 1st row. 16th row: As for the 2nd row. 17th row: As for the 13th row. 18th row: As for the 2nd row. These 18 rows form one pattern. Continue in pattern, but dec. 1 st. at both ends of the next row and every following 3rd row until 144 sts. remain. Work 4 rows after the last dec. row, then work 1½in. in k. 1, p. 1 rib, ending with a wrong side row. Change back to the pattern, but inc. 1 st. at both ends of every 3rd row until there are 186 sts. Continue without shaping until the work measures 16½in. from the beginning.

Armhole shaping: Cast off 6 sts. at the beginning of next 2 rows, then dec. 1 st. at both ends of every row until 148 sts. remain. Continue without shaping until the work measures 23½in. from the beginning.

Shoulder shaping: Cast off 13 sts. at the beginning of the next 8 rows. Cast off the remainder for the back of the neck.

Left Front

Cast on 100 sts. 1st row: P. 4, * k. 8, p. 4; rep. from * to the last 12 sts. (k. 1, p. 1) 6 times. Continue in pattern, keeping the 12 border sts. in rib, but dec. 1 st. at the beginning of the 9th row and every following 3rd row until 76 sts. remain. Work 2 rows after the last dec. row, then work 1½in. in k. 1, p. 1 rib, ending with a wrong side row. Change back to the pattern, but inc. 1 st. at the side edge on every 3rd row until there are 95 sts. Continue without shaping until the work measures 16½in. from the beginning, ending at the side edge.

Armhole shaping: Cast off 6 sts. at the beginning of the next row, then dec. 1 st. at the same edge on every row until 82 sts. remain. Continue without shaping until the work measures 20in. from the beginning, ending at the neck edge.

Neck shaping: Rib 12, then slip these 12 sts. on to a spare needle, cast off the next 7 sts., then pattern to the end of the row. Dec. 1 st. at the neck edge on every row until 52 sts. remain. Continue without shaping until the work measures 23½in. from the beginning, ending at the armhole edge.

Shoulder shaping: Cast off 13 sts. at the beginning of the next row and next 3 alternate rows.

Right Front

Cast on 100 sts. 1st row: Rib 12, p. 4, * k. 8, p. 4; rep. from * to the end. Continue in pattern, keeping the 12 border sts. in rib, and dec. 1 st. at end of the 9th row. 10th row: Pattern to the last 12 sts.; rib 12. Make a buttonhole as follows: 11th row: Rib 4, cast off 3, rib 5, pattern to the end. 12th row: Pattern to the last 9 sts., rib 5, cast on 3, rib 4. Continue to dec. at the side edge on every 3rd row until 76 sts. remain, but at the same time continue to make buttonholes on every 17th and 18th row until there are 12 in all. Work to match the left front, but with all shapings at opposite edges.

Sleeves

Cast on 64 sts. and work in pattern for 2in. as given for the back. Continue in pattern, but inc. 1 st. at both ends of the next row and every following 5th row until there are 126 sts. Continue without shaping until the work measures 18in. from the beginning. Shape the top by casting off 6 sts. at the beginning of the next 2 rows, dec. 1 st. at both ends of every alternate row until 94 sts. remain, then dec. 1 st. at both ends of every row until 24 sts. remain. Cast off.

Neck Band

Join the shoulder seams, then, with the right side of the work facing, slip the 12 border sts. of the right front on to one needle, pick up and k. 32 sts. along the neck edge of the right front, 48 sts. across the back of the neck, 32 sts. along the neck edge of the left front, then rib the 12 border sts. Work 5 rows in rib, then make a buttonhole as before. Work 4 more rows. Cast off.

Making Up

Press the work very lightly. Sew in the sleeves, then sew up the side and sleeve seams. Sew on the buttons.

THE MUSEUMS OF NEW ZEALAND

IN her earlier articles in this series Enid B. V. Phillips dealt with the establishment and growth of the metropolitan museums in New Zealand and several provincial museums. She continues the series this month with a description of the fine china and antiques in the

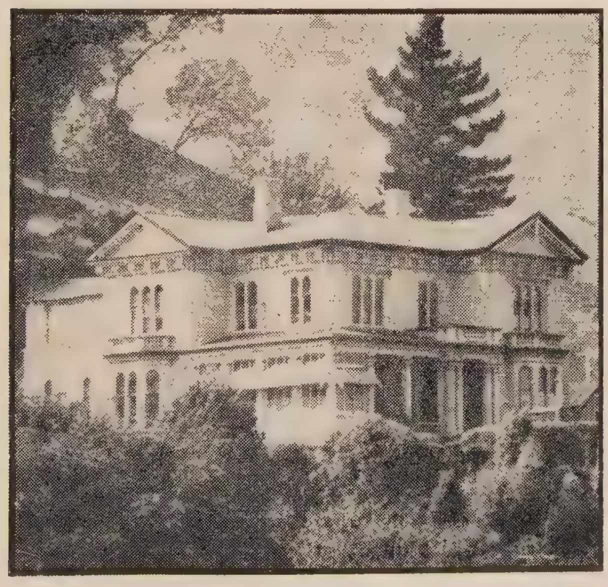
Marsden Collection at the Cawthron Institute

MOTORISTS driving through the apple-growing lands of Stoke, near Nelson, invariably comment on the picturesque stone church which stands on the outskirts of the township. Few of them are aware that the stone for this house of worship was obtained from the Poorman's Valley stream and sledged down by one of the earliest settlers in the district, Thomas Marsden, and his young son, James. The plans for the Nelson settlement had been drawn up in London, and the Marsdens had picked two sections in the ballot before leaving for New Zealand. One property was in the town (where the Marsden Church Hall is now situated, the foundation stone being laid by their son James on May 31, 1922, and solemnly dedicated "to the glory of God" by the Most Rev. Churchill Julius, Primate and first Bishop of Nelson, and James Marsden's great friend the Right Rev. W. C. Sadlier, fourth Bishop of Nelson), and the other was in the country. It was on the country section, adjoining the site of the Anglican Church at Stoke, that the Marsdens built their small wooden home, which they called "Isel."

The front portion of the house, with its romantic balcony and arched casements accentuated by mellow brick quoining and its triple gables and great walls of grey-blue stone 1½ft. in depth, was added later, young Marsden helping his father to secure sufficient stone from the same source as before. The stone motif is repeated in the coping enclosing the circular flowerbeds and in the long border by the wide, creeper-covered chimney, and the stables at the back, too, have a cobbled floor.

The Three Graces

A small stream forms a natural boundary on one side of the estate, but a bridge barred by a wooden gate gives access from the road. One can cross over beside the bamboo thickets, their stems thick as a man's wrist and their leaf spears standing sharply against the broad shields of the karaka foliage, and wander through the long grass past the group of Canary Island pines (the Three Graces their owner used to call them) and pause to admire the immense liriodendron—no botanical gardens in the Dominion can boast a finer tulip tree than this one—and its companion magnolia, almost as tall as the homestead, and perhaps pluck a peach or a pear from the orchard before continuing toward the house. Marsden senior was very proud of his orchard, which he had planted with a specimen of every fruit available even to the more exotic varieties such as a mulberry, a medlar, and an extremely prolific fig tree.



The Cawthron Institute, Nelson.

[W. C. Davies photo.

"Isel's" setting of magnificent trees, which was planted by the original owner of the Marsden homestead, at Stoke, Nelson. The conifer plantation is on the right, with the homestead in the distant background.

The carriage drive winds through a plantation of conifers. Here flourish gigantic sugar pines, their long graceful cones still sticky to the touch long after all the seeds have gone (this species sometimes grows at a height of 9000ft. in its native habitat, Oregon); maritime pines from the Mediterranean; digger pines, indigenous to the Californian coast; Monterey pines and cypresses; lawsonianas and cedars of Lebanon; magnificent wellingtonias with amazingly small, scaly seed-vessels for a tree whose local sobriquet is bigwood; *pinus longifolia* from India; stone pines, usually seen in the Mediterranean regions anywhere from Portugal to Asia Minor; and that close relative of the Norfolk Island pine and the kauri the Queensland bunya-bunya, which provides food for the natives in the seed content of its pineapple-shaped cones.

Entrancing Experience

It is an entrancing experience to stroll up the drive at dusk when the wind soughs softly like the distant sea and the scented wings of the wild sweet pea are poised among the grasses like a myriad lavender moths, when the long, clutching tails of the monkey puzzle assume grotesque attitudes such as would have inspired the artist Arthur Rackham, and when the great clumps of agapanthus gleam ghost grey in the gathering darkness. Presently the conifers give place to an avenue of beeches, their latticework of leaves delicate jade in the spring and deep chalcedony in summer.

"Isel's" hospitable door stands open and the light from the old carriage lamp in the hall streams down the steps in welcome and throws into bold relief the polished, mahogany-dark panelling of walls and ceiling, which matches the staircase. The pilasters are hand-carved in a spindle pattern, and an unexpected twist in the single piece of timber forming the rail is cleverly incorporated into the design, which terminates in a tight whorl like the tip of a fern frond and is reminiscent of the koru, the basic spiral motif in Maori carving. Strangely enough, the Cawthron Institute (a great square-set house the deep creamy colour of a magnolia and once the residence of a Nelson magistrate) has stairs with a similar balustrade save for the knot in the handrail, suggesting that they, too, were carved by the same master craftsman.

The large room on the left with a black Italian marble fireplace possessing a patina like satin used to be Marsden's library, and the white fan-shell-patterned ceiling and white marble mantel of the drawing-room across the hall formed a dazzling foil for the numerous objets d'art which James Marsden in later life inherited from a wealthy English relative named Brown, resulting in his making a special trip to the Old Country to ensure the safe transit of these treasures to New Zealand.

Paintings, Antiques, and China

The most valuable items of the Marsden collections of paintings, antiques, and china were left by James Wilfred Marsden, his wife, and his sister, Frances Charters Marsden, to the Cawthron Institute, Nelson. A selection of the china is displayed in the museum of the institute, which was first opened to the public in 1921, the curator being William C. Davies, and some of the paintings and antiques may be seen in the reception room.

The paintings depict such diverse subjects as a placid English millstream meandering by a beech spinney; a Scottish landscape of heather-covered moors and crags, with the inevitable fisherman angling in a mountain burn and a shepherd patiently trudging after his distant flock; a colourful French peasant gathering on market day in the shadow of a Gothic cathedral; a castle on the shores of the Aegean Sea, a classically robed company of nobles and their ladies grouped in front of the archway in the foreground; and Nicholas Maes's superb study of a sable-cloaked scholar reading in his library, his quill pen and inkstand and a large globe conveniently close to hand.

[*W. C. Davies photo.*

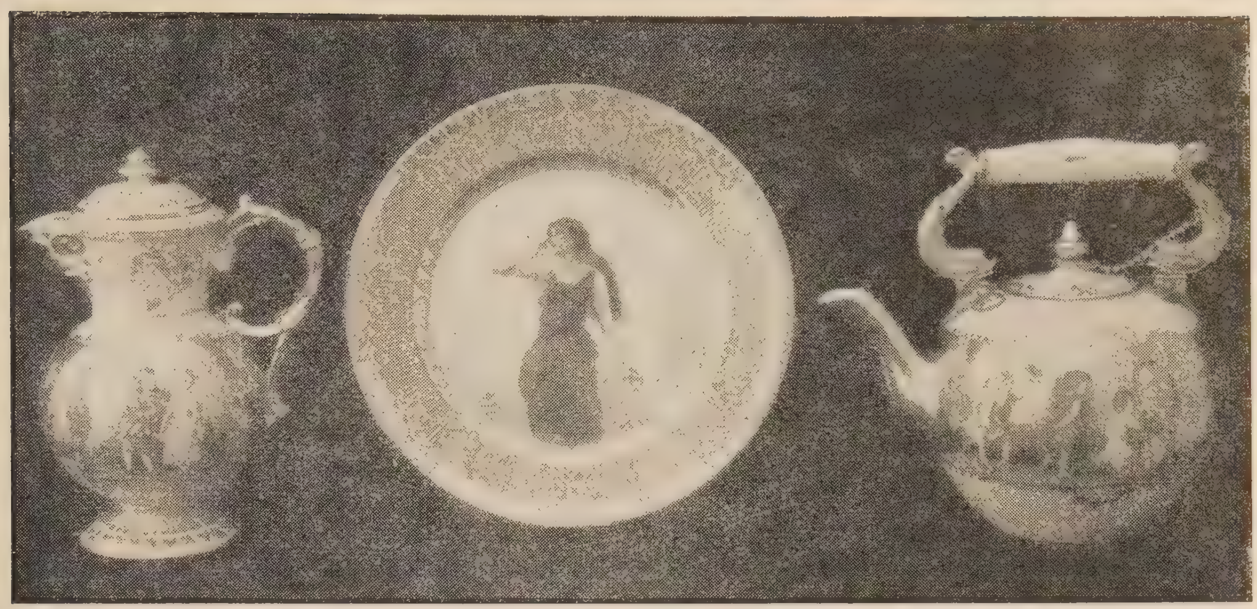
A selection of china from the Frances Charters Marsden bequest, including a set of Sevres plates depicting Louis XVI and some of the ladies of the French court.

The 17th century chairs, tapestry-covered and handcarved with satyrs and other Greek and Roman deities, or upholstered in smooth leather and set off by acanthus-leaf carvings or clusters of grapes, were likewise a legacy from James Marsden, together with other items of antique furniture at present in store, one piece being reputed to have belonged to Prince Rupert. These include a Jacobean dropleaf table which has handcarved legs; an immense oak sideboard with lions' heads for doorknobs and brackets of oak leaves and acorns supporting a big shelf with a smaller one overhead; a cabinet featuring four open-fronted shelves edged with flowers and fruits, the autumnal motif being further carried out by carvings of figs and berries on the closed-in compartment beneath; and a tall, two-decker cupboard, the top half having glass doors and the lower having wood with windpieces at the corners and a watchful dragon lying in wait for the unwary; a Chippendale work table specially fitted to hold all the needlewoman's aids to fine sewing; a walnut escritoire from the Royal Palace at Versailles, elaborately ornamented with inlay, miniatures of Court ladies and flower medallions enamelled in colours, a recessed mirror, and much ormolu.

Marsden Portraits

At the turn of the stairs in the Cawthron Institute is a portrait of a benevolent-looking old gentleman in a velvet smoking jacket and another of a serene-faced woman with softly-waved hair and a sensitive mouth who is garbed in a high-necked gown styled with leg-of-mutton sleeves, her toilet being completed by a large brooch and a long, finely linked chain necklace, the fashionable jewellery of the day. These are the likenesses of James Marsden and his sister, Frances, both noted in the Nelson diocese for their generosity and good works. Frances Marsden endowed the Church with practically her entire estate and her brother did likewise with at least half of his wealth, one-fourth share in the residue of his estate and 65 acres of land being left to the Cawthron Institute for research work in agriculture and forestry. Furthermore, Marsden and his wife, who rejoiced in the charming name of one of J. M. Barrie's heroines, Mary Rose, supplemented Frances Marsden's gift of fine china to the museum (which is an integral part of the Cawthron Institute and mainly of a technological nature) with many of their own choice possessions.

The sight of the showcase containing the Marsden china (the Frances Charters Marsden bequest) gives the Cawthron Museum visitor a shock of delight. Here is a set of Sevres plates in the rich shade known as Rose Pompadour, one of the large plates portraying Louis XIV with his dark curls cascading cavalier fashion down his royal blue robes, and



[*W. C. Davies photo.*

Valuable exhibits from the Marsden collection. The pink and gold teapot comes from Vienna and is considered the finest piece in the Cawthron Museum. There is also a hot-water jug to match.

another the quizzical Dauphin (later Louis XVI), double-chinned and portly in his gold-braided puce coat and white peruke. Each of the smaller plates depicts a lady of the French court, and among these portraits are those of the beringletted beauty the Marquise de Maintenon, a pair of pear-shaped pendants adorning her pretty ears (she afterwards became Louis XIV's second wife); the Duchesse du Maine, the daughter-in-law of Louis XIV; the child-faced bride of the Marquis de Montesson, incredibly slim waisted and attired with becoming simplicity (she later wedded Louis Phillipe, Duc d'Orleans); the voluptuous Madame de Pompadour, the plainness of her head covering, a peasant handkerchief, accentuating the contours of a face whose every feature expressed full consciousness of her power; the sister of Louis XVI—the two resembled each other closely, though Madame Elizabeth was a much more refined edition of her brother; and Madame de Lamballe, a French princess who was evidently more practical than her curls and coquettish, rose-heaped hat would indicate, for she held the important post of superintendent of the Royal Household under Louis XVI's fair Queen, Marie Antoinette.

Lady of Fashion

A coffee set in gold and bleu-de-roi, one of the most beautiful of the Sevres colours, also depicts the Duchesse du Maine, Madame de Lamballe, and the Marquise de Montesson, matured into a lady of fashion yet still retaining that air of youthful radiance withal which rivalled the loveliness of the ill-fated Queen. Marie Antoinette had a great love of china and is reputed to have possessed a dinner service of which each plate took 2 months to perfect at a cost of close on 100 livres. Moreover, the poet J. B. B. Nichols, in his delightful little quatrain describing her toilet table, makes particular mention of her

" . . . porcelain cups for red;
Here sate she, while her women tired and curled
The most unhappy head in all the world."

La Pompadour had previously set the mode in the lavish use of porcelain, frequently spending between 80,000 and 100,000 livres on her purchases.

Twin Worcester jugs, slender necked as swans and gilded with birds in flight, repeat in some degree that rich toning of royal blue akin to the Sevres shade. The work of Josiah Wedgwood, Queen's Potter during the reign of Charlotte and George III (the British monarch whom his subjects called "Farmer George"), is represented by a greyish-blue urn with overtones of green, the gilt head and horns of a ram forming the handle on each side of the vessel. One shelf in the show-case is given over entirely to plates—deep-blue Doulton and green-bordered Ridgway, russet-flowered Worcester and Crown Derby in autumnal colours, and pear-blossom-white Nantgarw patterned with jade dragons in seemingly Chinese style (actually the dragon is a Welsh emblem as well and this plate is the product of an early 19th century kiln founded by William Billingsley in South Wales).

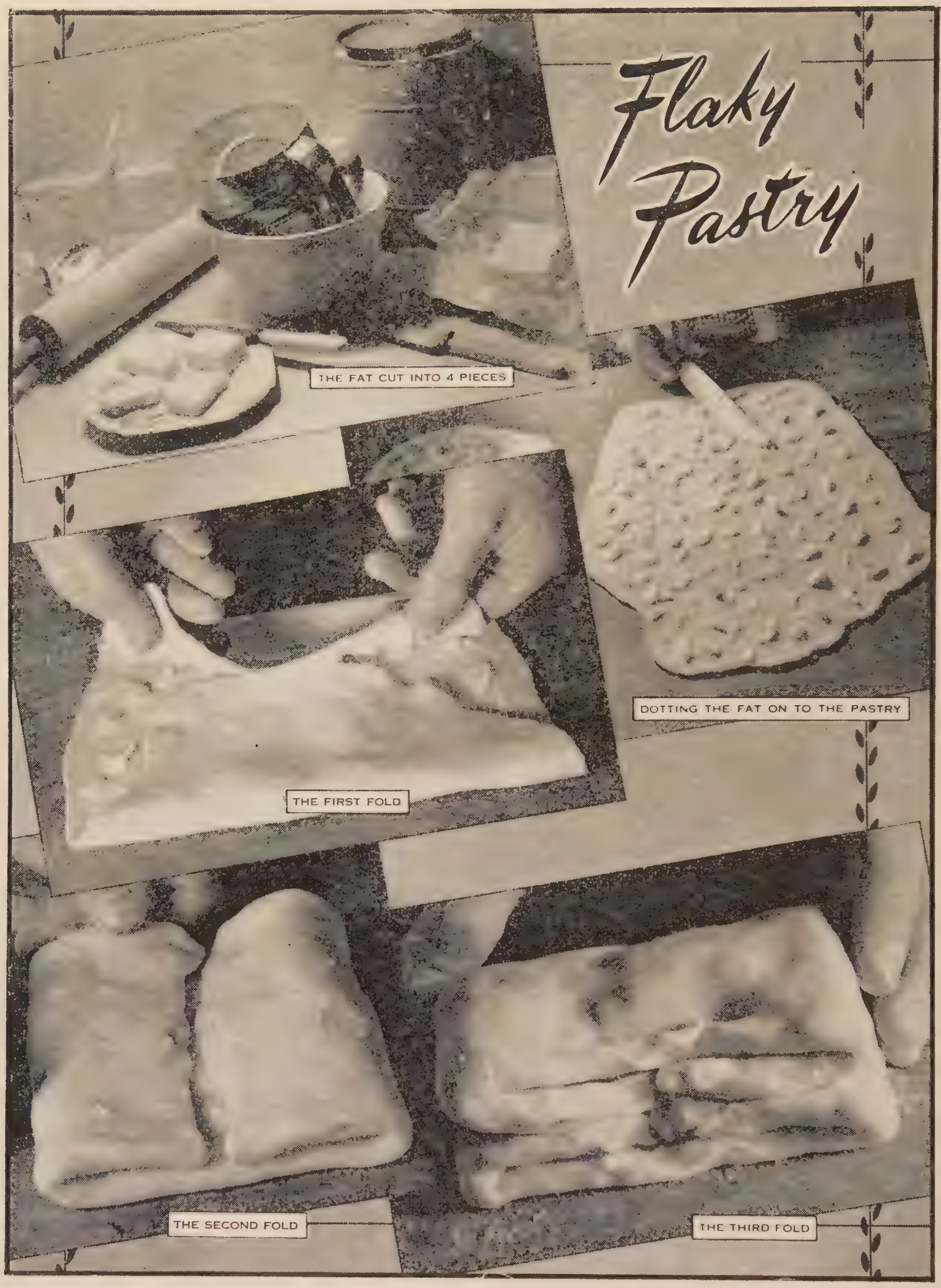
The cup and saucer section is equally varied and contains a cup that is a marvel of gilding; a tiny flower-shaped cup with an oval-petalled saucer; a claret-coloured cup set on a stem like a wine glass and with a microscopic radiating design superimposed in gold; a blossom-strewn cup of blue Dresden; and two covered cups each having a rose in the middle of the lid to lift it by and with a saucer fashioned with a quaint lattice fence to hold the cup steady. One cup features paintings of seascapes and a medieval castle and the other pastoral scenes, including a shepherd serenading his sweetheart, who sits upon a grassy bank, her dainty head wreathed in wild flowers—altogether a charming idyll of the meadows.

Handsome Potpourri Jars

A pair of handsome potpourri jars rimmed with a grapeleaf design in gold on a cobalt ground and presenting a frieze of colourful figures and events in Grecian history comes from Vienna; likewise, what is perhaps the finest piece in the whole collection, a fat pink and gold teapot portraying the most cherubic children and possessing an unusual hinged handle held upright in a horizontal position by two gold dolphins. There is also a hot-water jug to match. The goblets of Venetian glass are gilded with true-lovers' knots and garlanded with flowers, and an exquisite emerald-green vase is slashed with gold like the sleeves of an Elizabethan doublet. The rim of a decanter and gargantuan wine glass from Bohemia are also heavily gold encrusted and frosted with a design of vine leaves and bunches of vivid green grapes.

Thus, thanks to the benefactions of the Marsdens, the lovely treasures which once graced the family homestead at Stoke now add their lustre to the Cawthron Museum, where they give lasting pleasure to the numerous visitors from all parts of the Dominion and overseas to this important institute for scientific research, the first of its kind in the Southern Hemisphere.

Flaky Pastry



THE FAT CUT INTO 4 PIECES

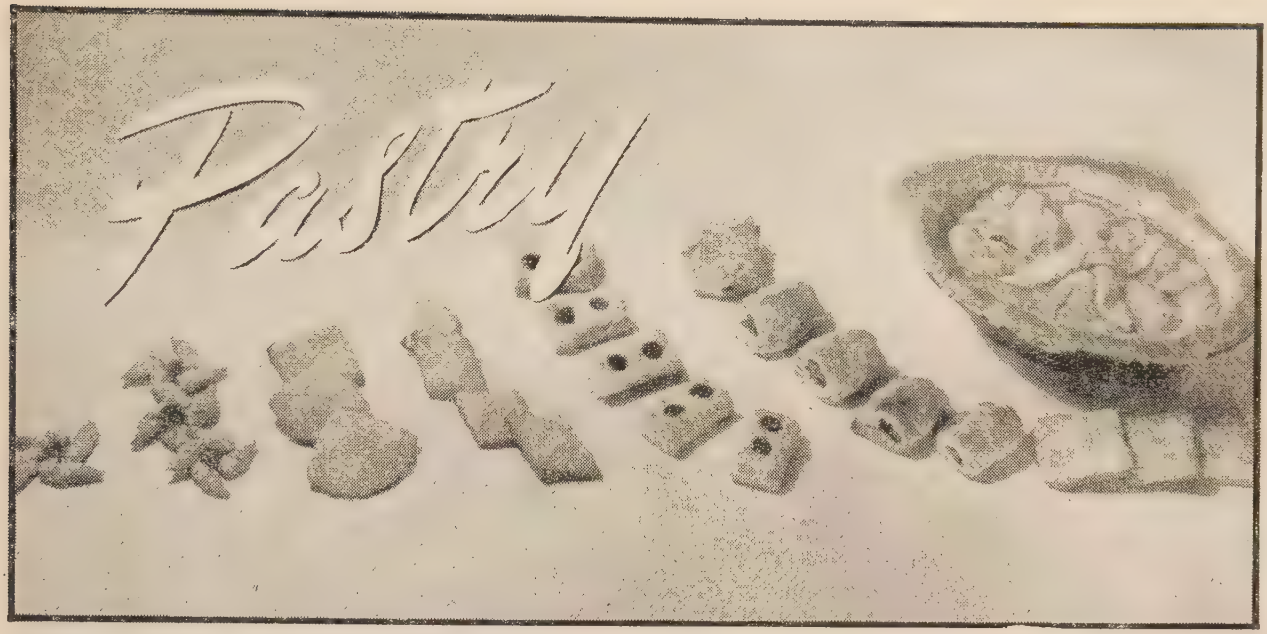
DOTTING THE FAT ON TO THE PASTRY

THE FIRST FOLD

THE SECOND FOLD

THE THIRD FOLD

[Photographs on this and opposite pages by Sparrow Industrial Pictures Ltd.



Methods of Making and Using the Three Types

PASTRY has many uses in cooking. Cakes, savouries, pies, tarts, and shells to hold some attractive and appetising mixture can all be made with one of the three kinds of pastry. It is the more useful because a fairly large quantity can be prepared quickly at one time and what is not needed immediately can be stored, cooked or uncooked, in a cool place for some days. This is an advantage to the busy housewife, who can prepare pastry in advance and roll out what she needs when she needs it, or she can bake several shells and prepare the fillings for them when she finds it necessary. In this article Nell Macpherson, Rural Sociologist, Department of Agriculture, Auckland, gives advice on making and using each type of pastry.

PASTRY may be one of three kinds, depending on the amount of fat in the mixture and the method of adding it—plain or short pastry, puff pastry, and flaky pastry. Plain pastry contains two parts by weight of flour to one of fat and the fat is cut into the dry ingredients. Puff pastry has equal weights of flour and fat and the fat is rolled and folded into the mixed dough. Flaky pastry has flour and fat in the proportion of 4 : 3 and the fat is added to the mixture by a combination of the two methods.

Qualities of Good Pastry

Good pastry, irrespective of type, is tender and flaky, has a blistery surface, and is golden brown when cooked. It is easy to cut with a fork, but does not crumble.

Tenderness depends largely on the amount of fat and water used. Too much fat will make the pastry so tender that it crumbles and too much water will make pastry tough. Too much mixing, too much handling, and too much flour when rolling will also make pastry tough.

Flakiness depends on both the amount of fat used and the way in which it is mixed with the flour. If small pieces of fat remain in the dough after the rolling and cutting, they will melt when the pastry is baked and give it a much more light and flaky texture.

The secret of making successful pastry is practice.

Technique

Mixing: Avoid too much mixing. Sift the flour and salt together and then cut in the fat until the mixture looks like coarse breadcrumbs. Sprinkle the water on carefully and mix the ingredients with a fork or knife. Add water until the mixture will just stick together when pressed lightly with the fingers. If mixing a large quantity, place the portions that cling together at the side of the bowl before adding more water. If only part of the mixture is to be cooked wrap the remainder in greaseproof or waxed paper to prevent its drying out.

Preparation for cooking: Roll only enough for one shell or crust at a time. Sprinkle flour lightly and evenly on the board and turn the pastry on to it. Toss the pastry lightly until the surface is just coated with flour and then roll it.

Rolling: Hold the roller in both hands and with quick, light movements roll the pastry in one direction away from the worker. Turn the pastry and roll it in any other direction. Never allow the roller to run off the edge of the pastry, as this spoils the edge. When rerolling scraps keep them flat so that they will appear even and untwisted.

Cooking: Pastry should be baked in a hot oven until it is firm, dry, and golden brown. The temperature varies with the kind of pastry—plain 400 degrees, flaky 450 degrees, and puff 500 degrees F. Always have the oven hot enough to start cooking the pastry immediately it is ready. When baking a pie start the cooking at a high temperature for 10 minutes and then lower it to cook the filling. Allow steam vents in the pastry.

A pastry shell or pie crust should be made slightly larger than the surface to be covered to allow for shrinkage. Cut the edges with scissors or a sharp knife. Be careful not to stretch the pastry when putting it on. Do not lift a large piece of pastry by the edges, as the middle will sag or stretch; rather fold it loosely in halves, or roll it on the roller and then unroll it on to the dish.

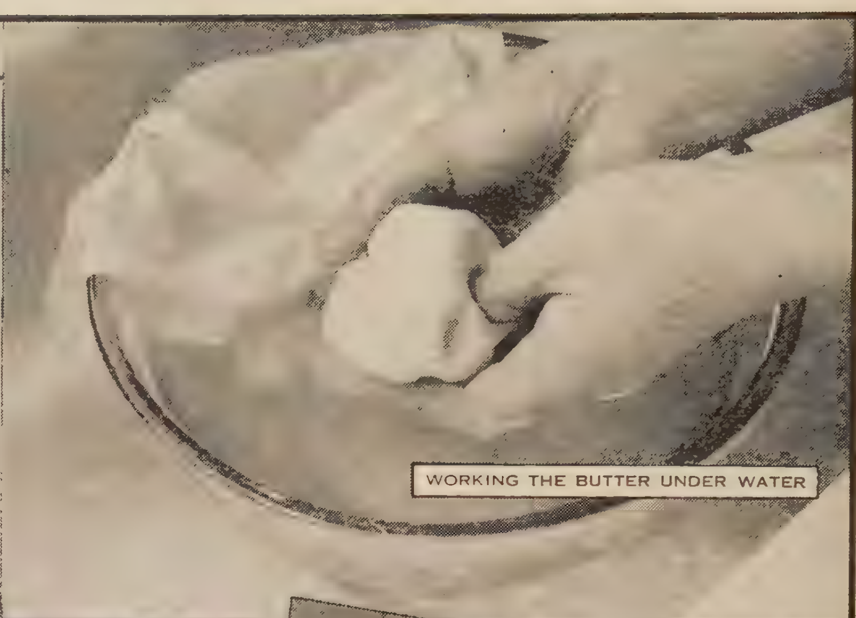
Store uncooked pastry in a refrigerator, if possible. Before cooking any pastry put it into a refrigerator, if one is available, for 5 to 10 minutes. Do not handle pastry more than necessary, as the warmer it is before being cooked the less light it will be.

Ingredients

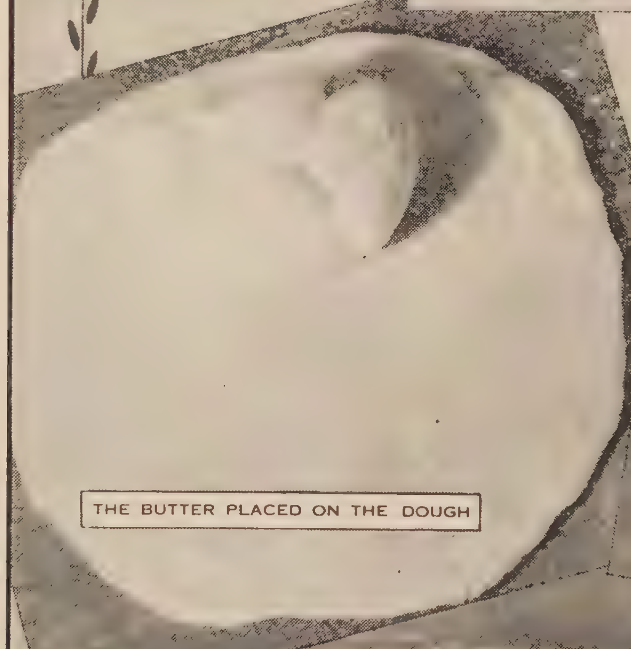
The basic ingredients of pastry are flour, fat, salt, and water.

Flour: Wholemeal or white flour may be used. Pastry made with wholemeal flour is not as light and tender as that made with white flour.

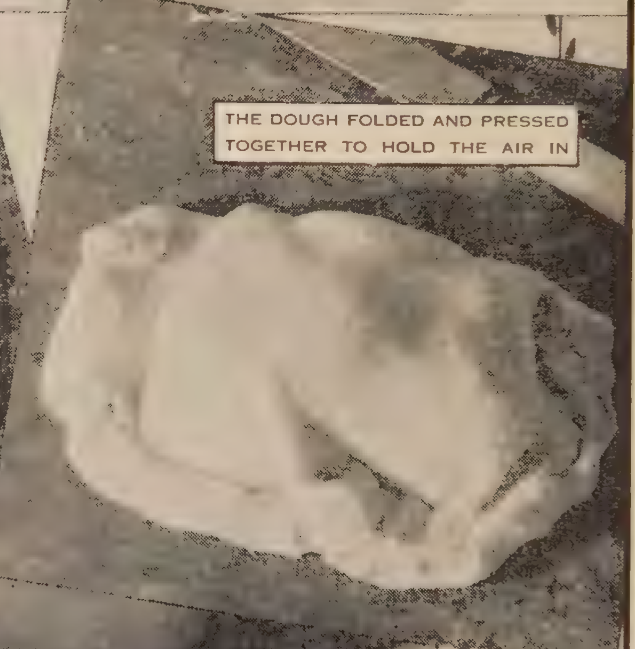
Puff Pastry



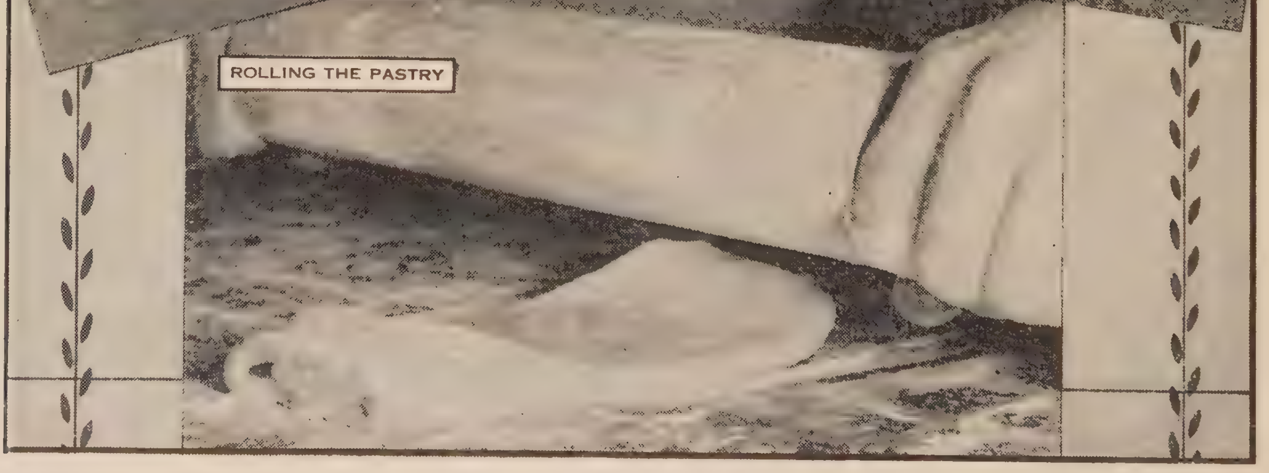
WORKING THE BUTTER UNDER WATER



THE BUTTER PLACED ON THE DOUGH



THE DOUGH FOLDED AND PRESSED TOGETHER TO HOLD THE AIR IN



ROLLING THE PASTRY

[*Photographs on this and opposite pages by Sparrow Industrial Pictures Ltd.*

Short Pastry

CUTTING FAT INTO THE MIXTURE
ADDING WATER TO THE MIXTURE
FITTING A PIE CRUST

Fat: Practically any fat can be used for pastry. The best probably is lard, but a mixture of lard and butter is very good. Clarified dripping or mutton fat is also good, but dripping tends to make a soft pastry and mutton fat a hard pastry. A mixture of these is very good for ordinary household short pastry for pie crusts. Vegetable fat can also be used, but it makes a harder pastry.

Water: Pastry may be made with either hot or cold water. Hot water is more often used with vegetable fat and it makes a crumbly rather than a flaky product. Cold water should be very cold—ice water if it is available. Only enough water to make the mass stick together should be used. When cold-water pastry is being used is should be kept very cool, as it will then be lighter when baked.

Salt should be added to all pastry to season it, but pastry for meat or savoury pies should be rather more salt.

Recipes

Short Pastry

4oz. of flour
2oz. of fat
¼ teaspoon of salt

Cut the fat into the flour until the mixture is like coarse breadcrumbs. Add sufficient cold water to make a stiff dough, sprinkling it on and mixing with a fork. Roll the dough on a lightly floured board and bake it at 400 degrees F. for 10 to 15 minutes.

This quantity makes one shell. For a two-crust pie (7in. dish) increase all the ingredients by half. This pastry is used for tarts, shells, two-crust pies, pasties, and baked roly-polies.

Flaky Pastry

4oz. of flour
3oz. of fat
½ teaspoon of salt

Divide the fat into 4 parts. Cut one into the flour and salt until the mixture is like coarse breadcrumbs. Add cold water to make a stiff dough. Roll it into an oblong and dot on another part of the fat. Fold the top and bottom to the middle, the sides to the middle, then the top over the bottom. Leave the dough in a cool place for 3 minutes, then roll it out into an oblong again. Add another part of the fat, fold it, leave it for 3 minutes, and roll it again. Add the last part of the fat, fold the dough, and leave it for 3 minutes. Roll it out to the desired shape and thickness—⅛ to ¼in. Before each rolling the pastry should be given a half turn to the left. Bake it at 450 degrees for 10 minutes.

Flaky pastry is used for meat-pie crusts, sausage rolls, top-crust pies, and pastry squares.

Puff Pastry

3oz. of fat (preferably butter)
3oz. of flour
¼ teaspoon of salt

Place the butter in a piece of muslin and work it in cold water until it is soft and pliable. Loosen it from the muslin and pat it into a square. Mix the flour, salt, and water into a dough of the same stiffness as the butter. Roll it into an oblong ¼in. thick, put the pat of butter on half the oblong, and fold the other half over it. Turn the dough and roll it out. Fold it in three in the envelope style and turn it again. Roll and fold it six times. Cut it with a sharp knife or cutter. Bake the pastry at 500 degrees F. for 8 to 10 minutes on ungreased trays well down in the oven.

Puff pastry is used for patty cases, pastry pinwheels, sausage rolls, and pastry squares.

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AT CHEMISTS AND DEPARTMENT STORES

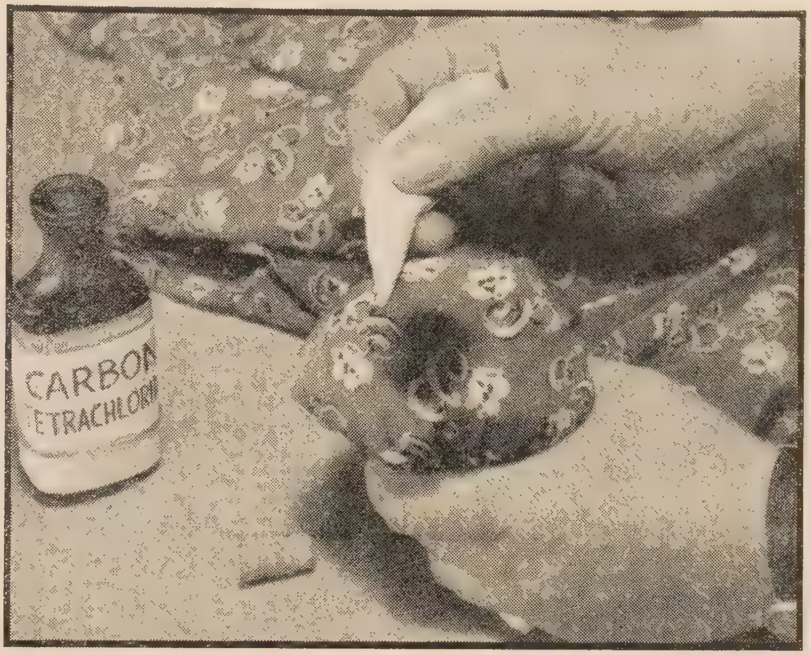
Prepared by

Richard Hudnut Ltd., 21 Federal Street Auckland

H1/50

Removing Stains from Materials which Cannot be Washed

THE removal of stains from washable materials was discussed in an article in last month's "Journal" by Evelyn E. Moore, Rural Sociologist, Department of Agriculture, Palmerston North. With fabrics which require dry cleaning greater skill is needed to remove stains successfully without forming rings and so-called water marks—in fact, they can rarely be removed successfully from clothes with over-all soiling, however slight, for obvious clean patches are produced. Such garments are best sent to a reliable dry cleaner at once. Yet, especially when fabrics are rough textured, not too light in colour, and fairly clean over all, it is reasonably safe to take out the kinds of stain for which methods are given in this article and so avoid an extra trip to a dry-cleaning firm or having to send a garment to be cleaned just when it is needed.



[Sparrow Industrial Pictures Ltd. photo.

THOUGH greater care than in the removal of stains from washable goods is necessary with other fabrics, the following simple precautions usually are all that are required to avoid disappointment, and they will ensure that, even if the stain is not removed, it will probably be lessened and will certainly not be made more noticeable:

Do not use any stain remover on coloured articles without first experimenting on a sample from a seam or other inconspicuous place.

Be particularly careful when treating light-coloured fabrics or fabrics with special finishes such as moiré taffeta.

Though prompt action is desirable to remove stains from articles already partly soiled, do not expect the cleaned area to be unnoticeable, for probably it will be as conspicuously clean as it was previously soiled. Gaberdines and other tightly woven fabrics absorb stains very deeply and often are difficult to clean without the surface appearance being altered. However, dry cleaning or washing usually removes the final traces of the stains.

If in doubt about what caused the stain, try removing it first with cold water, and then with a dry-cleaning fluid after the water has dried. If these fail, it is better to send the article to a dry cleaner, for the wrong treatment will often make a stain more difficult to remove.

Be careful in pressing garments which have been stained. Whether dry cleaned or cleaned with water, they should not be pressed until the treated area has dried, or further spotting may be caused.

Dry Cleaning at Home

Most New Zealanders are now so accustomed to the convenient and efficient service of dry-cleaning firms that they no longer consider doing their own. Nor is it justified, for it is more expensive, wasteful of cleaning fluid which the housewife cannot distil and use again, and, unless proper precautions are taken, it can be extremely dangerous, as gases from some fluids may be ignited even by a hot electric plate or a cigarette end.

However, for the removal of grease spots and stains a dry-cleaning solvent is most useful, and carbon tetrachloride is particularly recommended because, unlike petrol, it is not inflammable. Coal-tar benzene and petrol are also useful solvents, particularly for tar and stubborn grease stains, but they are very inflammable, so that not only is great care essential in their use, but they should always be stored well away from open fires, gas ranges, and other possible fire hazards.

Preventing Swales or Water Marks

One of the most frequent causes of disappointment is the unsightly ring which is left after a stain has been removed. Usually it may be prevented by using the following method of sponging the spot:

Fold a piece of soft, absorbent cotton rag or cheese cloth, or even blotting paper, into a pad and place it under the spot. Take a small, slightly-pointed swab wetted with the solvent as in the illustration above, make a ring an inch or two out from the edge of the stain, and proceed in a spiral of decreasing circles until the stain is covered. If the stain is mostly on one surface, place that side on the underneath pad. If a ring is still apparent, the edge can be diffused by rubbing it lightly with a pad just dampened with the solvent.

It is advisable to use the stain remover very sparingly and avoid letting it flow, and to move the pad under the spot frequently to absorb the grease more easily, replacing it if it gets too damp.

Methods of Removing Stains

Because final washing in hot soapy water is often impossible, and because fewer chemicals can be used with safety, it is often more difficult to remove stains completely from materials which cannot be washed than from other fabrics. The following methods are reasonably successful, but if they fail, sending the garment to a reliable dry cleaner is invariably safer than experimenting further.

Grease and Oil Stains

A stain caused by clean grease or oil, such as mutton fat, lard, or sewing machine oil, often may be removed completely by ironing the fabric between two sheets of blotting paper with a warm but not hot iron, but cod-liver oil stains, black or dirty oil stains, and stains of fatty foods such as chocolate and ice cream should never be ironed first, as they are made more difficult to remove. Food stains should be sponged with cool water, allowed to dry in the air, and then treated with a grease solvent such as carbon tetrachloride. Cod-liver oil and other grease stains should be treated directly with a solvent. Methylated spirit will dissolve stains caused by food fats and oils, but will not remove

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machine oil, axle grease, paraffin oil, or wax.

SUMMARY OF CHIEF METHODS OF STAIN REMOVAL

Stain	Order of Treatment
Beverages, fruit, non-greasy food stains, blood	Soak or rinse in cool water. Wash with hot, soapy water or boil. Use a bleaching agent on white or fast-coloured materials. Soak or rinse wool, silk, and acetate rayon in cool water. Use hydrogen peroxide to bleach if necessary.
Dyes	Soak in methylated spirit and ammonia or methylated spirit and vinegar.
Grass	Extract with methylated spirit or eucalyptus. Wash with hot, soapy water.
Grease, wax	Wash in hot, soapy water. Rub resistant stains with oil and wash again. Extract with cleaning solvent.
Ink, copying	Extract with methylated spirit.
Ink, writing	Use absorbents, and then wash. Finally remove iron stains with lemon juice and salt or with oxalic acid.
Iron (rust)	Soak in warm dilute oxalic acid solution. Rinse well with water to which a few drops of household ammonia have been added.
Mildew	Wash, rub with soap, and bleach in sunlight. Use a bleaching chemical on white or fast-coloured materials.
Paint	Extract with turpentine and hot, soapy water. If old, soak in acetone and then treat.
Scorch	Expose to sunlight, followed by mild bleaching when practicable.

Absorbents, such as talc, sprinkled directly on many grease stains and left for about an hour or overnight, will remove them effectively. Another method, particularly suitable for felts and some leathers, is to make a paste of carbon tetrachloride and talc or fuller's earth, rub it on, and allow it to dry. It absorbs the oil or grease, and when the dry powder is brushed off the stain is usually found to have been removed; a second treatment may be required. A raw starch or cornflour paste may also be used to absorb grease and oil, and with these treatments there is much less danger of rings being formed.

If a dark mark remains after the grease stain has been removed, a solvent soap or soapless detergent may be tried after ensuring that it will not harm the fabric or cause the colours to run.

Materials with tar and black machine oil or grease stains are often best sent to a dry cleaner for treatment, though repeated sponging with coal-tar benzene (not petrol) or carbon tetrachloride may be successful.

Soapless Detergents

Sulphonated fatty alcohols or soapless detergents are comparatively new cleansing substances sold under trade names. As yet they are rarely available to the New Zealand housewife, most of the supply being used for industrial purposes. When they become available they will probably be of use in many households, for they have a cleansing power comparable with that of soap, though chemically they are quite dissimilar.

Unlike soap, they form a good lather in the presence of salt and vinegar, and so may be used to wash materials with colours which run or bleed when washed in soapy water. Soaking, washing, and rinsing can be carried out with acetic acid (white vinegar or vinegar) or even with both vinegar and salt in the water, and effective cleansing is obtained with much less danger of colour loss. Suitable proportions are 2 tablespoons of vinegar and 2 to 4 tablespoons of salt to each gallon of water.

Soapless detergents can be used with greater safety for washing woollens and silks, for they do not form an alkaline solution in water. Soap solution, even when free from washing soda, is slightly alkaline, and this can contribute toward the shrinkage and yellowing which occur if woollens are washed carelessly or not properly rinsed.

These synthetic detergents are also often used with hard water, for, unlike soap, they do not form grey scum on the water and, though they do not form such a thick lather as soap, less is required for efficient cleansing. As their wetting power in the presence of grease is good, they may also be used for washing greasy articles, and for this reason they are becoming very popular for dish washing in countries where they are easily obtainable.

Non-greasy Stains

Beverage, food, and blood: Sponging immediately with cool water is the best treatment. If some of the stain remains, sponging with dry-cleaning fluid usually removes the rest of it. After using one cleaning fluid always wait until the fabric is dry before trying another. If the stain is old or this treatment fails, it is not advisable to try other home methods, as they may spoil the garment.

Carbon paper, transfer ink, and ink pencil: Sponge the stain with methylated spirit. Do not use water, as this tends to spread the stain, particularly of ink pencil.

Grass: Sponge with methylated spirit, followed by cool water.

Ink may be difficult to remove from fabrics if they are not to be washed. Often a thick paste of mustard and water applied promptly to the stain will remove ink. Talc, raw starch, or fuller's earth made into a thick paste with water is another good absorbent. Leave the paste to dry and then brush it out of the fabric.

Paint and varnish: Sponge with turpentine.

Perspiration stains are frequently a problem on garments which cannot be washed. Sometimes they are permanent, especially if the colours have run, but if the colours have changed only slightly, they can be restored sometimes by holding the dampened stain over a bottle of household ammonia or by sponging with white vinegar. Both treatments may be needed.

When sponging with water and cleaning solvent has no effect, other stains are often better left for a dry cleaner to remove.

Medicine Stains

Often medicine stains cannot be removed by substances readily available to the housewife. When in doubt it is advisable to remove as much of the stain as possible immediately by rinsing in cold or lukewarm water and, if the article is not washable, to send it to a dry cleaner as soon as possible. Boiling or washing in hot suds after rinsing frequently will remove the last traces of many medicine stains from washable articles. Special treatments for some stains will be given, though the ordinary bleaching treatment or treatment with oxalic acid removes many resistant brown or yellow stains.

Stains on blankets which cannot be removed by ordinary washing sometimes may be removed by placing the material in boiling water for a minute or two, but no longer, preferably with a soapless detergent added. If it is removed immediately and rinsed first in hot and then in cooler water, very little shrinkage will occur.

Stains which can be removed successfully at home include cod-liver oil, iodine, and some cough mixtures. Mercurochrome, argyrol, silver nitrate, and acriflavine stains are most difficult to remove, and when they are on delicate fabrics the housewife often may prefer to send them to a dry cleaner for treatment.

Syrupy medicines: Cough mixtures and other medicines with a sweet, syrupy base usually can be removed by washing in warm, soapy water. If not, or if the article cannot be washed easily, sponging with a mixture of 1 cup of methylated spirit and 2 cups of water may remove them.

Iodine: Fresh iodine stains usually can be removed by soaking them in cool water and washing them. If stains are old, soak them for 15 minutes in a solution of 1 cup of household ammonia and 2 cups of water, wash them in warm, soapy water, and rinse them. The use of photographer's hypo (sodium thiosulphate) may also be successful. Dissolve a few crystals of hypo in ½ cup of water, sponge the stain with the solution, then sponge it thoroughly with cool water.

Fish-liver oil stains on babies' clothing can present quite a problem, for the spots, though colourless and often unnoticeable when fresh, become yellow and difficult or even impossible to wash out when they are old. Therefore, clothes should be examined carefully for stains after fish-liver oil has been given a child. To treat them, place an absorbent pad under the stain, wet a pad with cleaning solvent, and sponge the mark until most of the oil has been removed. Washing then removes the remainder of the stain.

Mercurochrome stains should be rinsed as soon as possible with cool water, for, if they dry into the fabric, they are very difficult to remove. If the stains remain after a thorough rinsing with water, soak them in a solution of 1 cup of methylated spirit and 2 cups of water. If some stain still remains, it can be removed from suitable fabrics by bleaching, or by using one of the dye-stripping compounds (sodium hydrosulphite), which may also be used with safety on woollen fabrics. Dissolve 1oz. in 1 pint of water, and soak the article for an hour in the cold solution. Rinse well after the treatment. Articles which are not washable may be sponged as soon as possible with the mixture of methylated spirit and water provided the colours do not run. Follow this by sponging with water to which a few drops of ammonia have been added and then with white vinegar.

Argyrol: The treatments recommended are often successful, but sometimes even a combination of them fails to remove argyrol stains which are very persistent. White or fast-coloured washable fabrics may be soaked in cool water and washed. If necessary a bleaching treatment may be given suitable garments, but they may require the following treatment to remove the stains completely, and even it is not always successful: Sprinkle powdered pepsin (obtainable from a chemist) on the damp stains, work it well in, and let it stand for about an hour; rinse the pepsin out, put a few drops of tincture of iodine on the stains, let them stand for 10 to 15 minutes, then sponge them with a solution of a few crystals of photographer's hypo in ½ cup of water; rinse thoroughly. Coloured fabrics also may usually be given this treatment. If argyrol is spilt on fabrics which can be only dry cleaned, they are better sent to a cleaner for treatment as soon as possible.

Silver nitrate stains, though colourless when fresh, rapidly turn brown, so the material should be rinsed and washed immediately if possible. If not, the treatment with iodine and photographer's hypo used to remove argyrol may be successful.

Iron medicine: Sponge or rinse the stains with cool water and, if they remain, treat them with oxalic acid as described in last month's article.

Curtains, Carpets, and Upholstery

Treatments used on garments and household linen usually can be used with success on upholstery, carpets, or heavy curtains. As much as possible of the staining substance should be scraped off before treatment is begun. In general, absorbent treatments are better than liquid ones, and fuller's earth, starch, or talc paste should be tried before liquid treatments, which sometimes tend to wash the stain deeper into the pile of the fabric.

Grease, oil, and wax: Apply a paste of powder and cleaning fluid, let it dry, and brush it out. Repeat the treatment if necessary.

Food stains should first be sponged with lukewarm water to remove water-soluble substances. If the stains remain when dry, apply a paste of starch or fuller's earth and cleaning fluid and brush it out when it is dry.

Chewing gum: Soften the edges with carbon tetrachloride or other solvent. Work off the gum with the edge of a teaspoon, applying more solvent as it is removed.

Tea: Blot up as much as possible with a soft absorbent rag and sponge the stain with lukewarm water. If the stain remains when it is dry, sponge it with hot water.

Ink: Blot up as much as possible with blotting paper and apply a thick paste of mustard or starch and water. Leave it for an hour or two, remove the paste, and shampoo the stain well with a good-quality soap. This method is usually completely successful when the stains are fresh.

Care and Time Needed

Though these treatments in general can be recommended as safe for use at home, the housewife must take reasonable care and time if they are to be successful.

Boiling and ironing tend to set some stains more firmly into the fabric, so that, unless it is known that stains will be removed effectively in the wash, preliminary soaking in cool water or treatment with a solvent should always be given, for later treatment is not always successful.

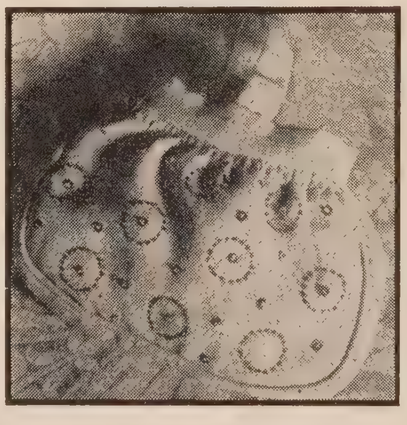
A warning should be given about two common stains—those of fruit and ink.

Fruit stains sometimes are said to fade when the fruit which caused the stains goes out of season. They do not. It is true that frequent boiling or washing will fade them somewhat, but if a stain has been treated carelessly and not rinsed immediately in water, bleaching with one of the chemical bleaching materials is usually necessary to remove it.

Soaking in milk is often claimed to be the best method of removing ink stains, but it is not recommended. Though sour milk does help to remove ink stains, it is not very efficient, and if it is used on some fabrics and allowed to dry, it leaves another stain which can be difficult to remove.

A Hand-made Evening Bag

THIS pretty party bag can be made from quite small scraps of silk, for all that are needed are two pieces 9½in. by 6in. for the sides, two pieces 7in. by 2½in. for the top band, a piece 12in. by 2½in. for the handle, and a piece 20in. by 2in. for the gusset (joined if necessary). Also required are some material for the lining, 1¼yds. of fine piping cord, 5 dozen sequins, and ¼oz. of little beads.



Round off the two lower corners of one long edge of each side. Before making up the bag work the decoration as shown in the photograph. Mark the circles by drawing lightly round a halfpenny: sew the beads round the circles and a sequin held with a bead in the centre of each. Sew a few sequins between. Halve the piping cord and cover each piece with crossway strips. Stitch each between one side of the bag and one long side of the gusset.

From the lining material cut pieces for the sides and gusset. Stitch the gusset in place between the lining sides. Slip the lining into the bag, wrong sides together, and gather along the top of bag and lining. Interline the top band and join it into a circle. Fold it in halves lengthwise, insert the raw edges of the bag, and fold in the gussets so that the piping cord meets. Interline the bag handle, fold it in halves lengthwise, stitch it, and turn it out. Sew it in place. Fasten the purse with a press stud in the centre of the top.

JELLY MAKING

By EVA TOPPING,
Rural Sociologist,
Department of Agriculture,
Auckland.

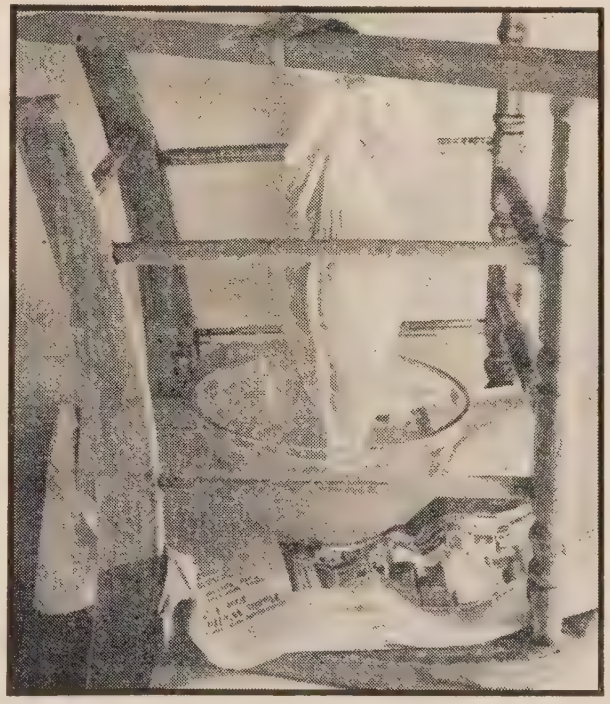
JAM and jelly making is one of those things that nearly every housewife can do, though not everyone can do it well. Most women can put fruit and water into a preserving pan and boil it with sugar; the result is nearly always jam that is at least edible, and there the matter rests. However, jelly making calls for a little more care and skill if the finished product is to be entirely satisfying to the palate and the eye. The beauty and fragrance of the fresh fruit are recalled by the flavour and ahoma of clear, sparkling, brightly coloured jelly.

[*Sparrow Industrial Pictures Ltd. photo.*

A GOOD jelly is a semi-solid mass which holds its shape when turned out on to a jam dish, but which is not too solid to quiver when the dish is moved. It should be tender enough to be cut easily with a spoon, yet firm enough to leave a clean-cut edge.

Fruits for jelly making must contain both pectin and acid, and as the amounts of these two substances change with the maturity of the fruit, decreasing as it ripens, a mixture of ripe and under-ripe fruit gives the best jelly. The ripe fruit supplies flavour and colour while the under-ripe fruit ensures a sufficiency of pectin and acid. Fruits which are naturally deficient in either pectin or acid may be combined with others which have a higher content of one or the other to make jelly. Interesting blendings of flavour and colour are obtained by combining fruits.

Some of those having sufficient quantities of pectin and acid for successful jelly making are tart apples, black and red currants, green gooseberries, grapes, guavas, grapefruit, lemons, oranges, some varieties of plums, passion fruit, and quinces. Those which do not contain sufficient quantities of these essential substances include apricots, blackberries, loganberries, nectarines, peaches, raspberries, and strawberries, all of which need the addition of some of the fruits from the first list. Apples and rhubarb are good "mixers," for they supply the necessary pectin and acid without appreciably altering the flavour of the other fruit used to make the jelly.



[*Sparrow Industrial Pictures Ltd. photo.*
An upturned chair makes a good stand for holding the jelly bag.

A flour bag or a piece of flannel or butter muslin will make a jelly bag. Take care that there are no holes in the bag through which pulp can ooze and cloud the juice. Butter muslin should be used in four thicknesses.

Cut the material into a square and seam along adjacent sides to make a pointed bag. Have the seams on the outside. Attach a length of tape with which to tie the mouth to the lowest point at the top of the bag. An upturned chair, set on a table, makes a good stand for holding the jelly bag.

General Directions

Prepare a mixture of ripe and slightly under-ripe fruit in small lots. Wash the fruit and discard any badly bruised or spoilt parts. Cut hard fruits such as apples and quinces into pieces, but the skin, cores, and pips should be retained. Put the fruit into a preserving pan, crushing soft and berry fruits to make the juice run freely. Add enough water barely to cover hard fruits; soft fruits need only sufficient water to start them cooking and to prevent them sticking to the bottom of the pan. Use as little water as possible; much water means longer boiling, and long boiling destroys the pectin and spoils the flavour and colour of the jelly.

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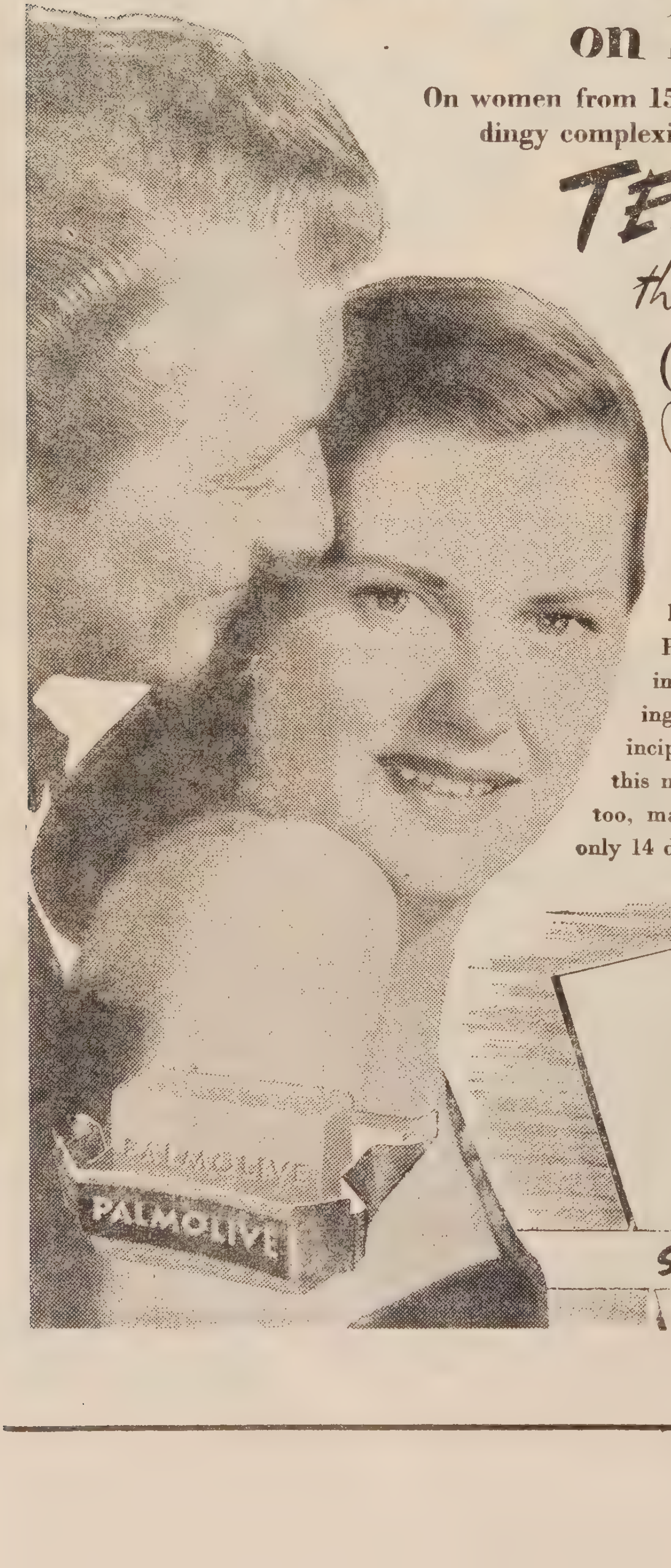

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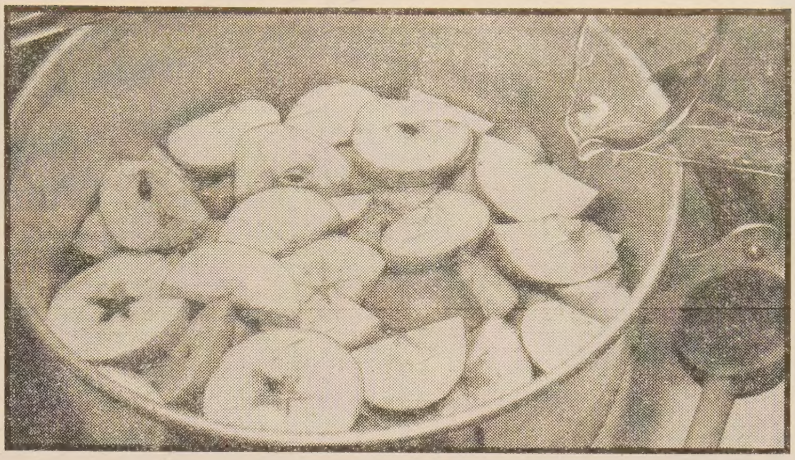
METHOD OF MAKING JELLIES

Set the pan over medium heat and cook the fruit until it is quite tender. Soft fruits need from 5 to 10 minutes' cooking and hard fruits about ½ hour. If the preserving pan has a lid, it should be used at this stage to hasten the cooking. Stir occasionally if necessary to prevent the pulp scorching. When the fruit is sufficiently cooked pour it at once into the jelly bag and let the juice drip. When the flow has almost stopped squeeze the bag to express the remaining juice. Strain the juice once more through a clean jelly bag or through a colander lined with a double thickness of butter muslin to make it as clear as possible.

Measure the juice so that the amount of sugar can be calculated. For most fruits allow ¾ pint of sugar for each 1 pint of juice. Very acid fruits such as tart apples and sour gooseberries require equal amounts of sugar and juice. Use no more than 4 pint measures of sugar and 6 pints of juice in one boiling. If made in large qantities, the jelly may be too dark, or by the time the last jars are filled it may be lumpy and uneven in texture.

Pour the juice into a clean preserving pan with a capacity about four times as great as the amount of juice to be cooked so that there will be no danger of the jelly boiling over. Bring the juice to boiling point and add the requisite quantity of sugar. Many cooks warm the sugar in the oven before adding it to the juice; this makes no difference to the jelly, but it does shorten the cooking time slightly. From this stage the preserving pan lid must not be used. Stir the juice until the sugar is dissolved, then boil it rapidly; the jelly should never simmer but should boil as hard as possible. Froth will form, but it need not be removed until a thick scum appears near the end of the boiling time.



[*Sparrow Industrial Pictures Ltd. photo.*

Hard fruits such as apples should be cut into pieces, skins, cores, and pips being retained.

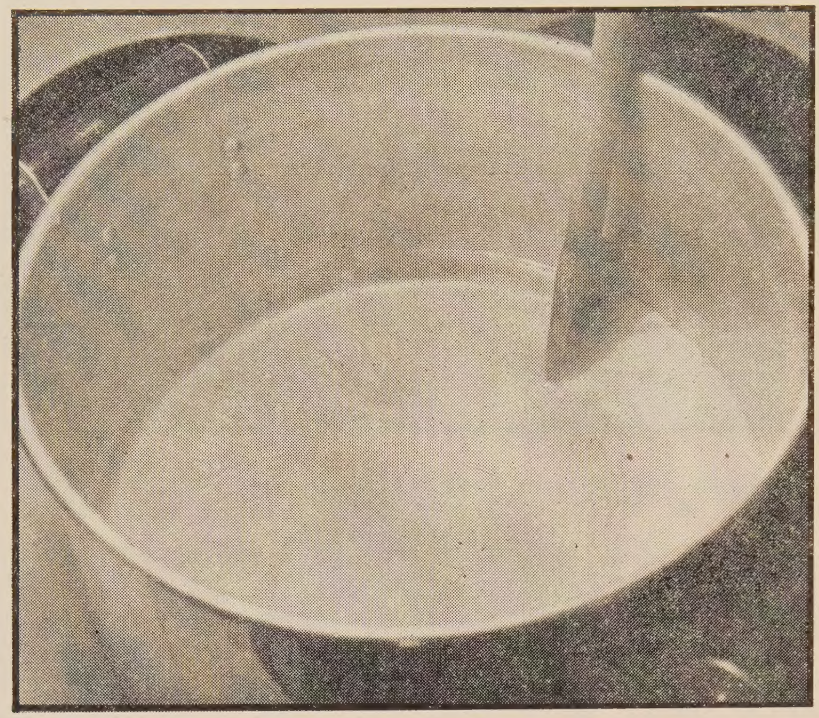
When the thick scum appears it is time to test the jelly for setting. There are two household tests for the setting point—the "sheeting" test and the "wrinkling" test. For the sheeting test take a little jelly in a metal spoon, cool it slightly, and pour it from the side; if the drops run together and fall off in a sheet, the jelly will set. For the wrinkling test put a little jelly on a cold plate, stand it in a draught to cool slightly, then push it with the finger; if wrinkles form, the setting point has been reached. The objection to the wrinkling test is that the jelly may become overcooked while the sample is cooling, even if it is withdrawn from the high heat.

Have sterilised, warmed jars ready and fill them with the boiling jelly to within ¼in. of the top. Use wide-mouthed jars if possible. Set them to cool, but do not allow draughts of cold air to play on the hot jars. When the jelly is quite cold it is ready to be covered and stored. Wipe the lips and outsides of the jars with a clean damp cloth to clear away any stickiness. If paraffin wax is available, melt it in a small pan and pour a thin film on the top of the jelly, moving the jars slightly to make the wax cover the jelly and adhere to the sides of the jars. If the jars have metal lids, place them in position; otherwise cover the jars with dampened transparent jam covers secured with rubber bands. Label the jars and store them in a cool, dry cupboard.

Some small wide-mouthed jars which will hold sufficient jelly for one meal can be used, for the preserve may be turned out on to the jam dish and is a colourful and attractive addition to the tea table.

The juice is poured into a clean preserving pan with a capacity about four times as great as the amount of juice.
[*Sparrow Industrial Pictures Ltd. photo.*

RECIPES FOR JELLIES



[*Sparrow Industrial Pictures Ltd. photo.*

The jelly should never simmer but should boil as hard as possible.

Recipes for Jellies

Apple Jelly

Windfalls, thinnings, or peelings and cores discarded from preserving may be used for apple jelly. Cut the apples into pieces, discarding all spoilt parts. Barely cover the fruit with water and cook it until it is quite tender. Strain the juice, measure it, and allow ¾ measure of sugar to 1 measure of juice. Continue cooking as described in the general directions, or add it to measured juice of other fruits with corresponding amounts of sugar.

Apple jelly with cloves: Add whole cloves to the apples during the first cooking in the desired proportion; 3 to 6 cloves to 1lb. of apples is the strength usually preferred.

Apple jelly with mint: Pack a cup tightly with mint leaves, pour boiling water over them, and steep them for 1 hour. Press and strain them, and add 2 tablespoons of the mint extract to each cup of apple juice. The jelly may be tinted with green vegetable colouring just before it is poured into the jars.

Apple jelly with rose geranium; Throw 2 or 3 rose geranium leaves into the boiling jelly when it is near the setting point. They wilt quickly and give off their flavour and perfume. Take them out just before pouring the jelly.

Ginger apple jelly: Add bruised whole ginger to the apples during the first boiling.

Black Currant Jelly

Black currants make a good jelly by themselves, but in some parts of the country this fruit is scarce and expensive, and apple or rhubarb juice may be used with the currants to make a larger quantity of jelly.

Use equal measures of black currant juice and sugar. For every 2 measures of black currant juice allow 1 measure of rhubarb juice and 1 measure of sugar or 1 measure of apple juice and ¾ measure of sugar.

Blackberry Jelly

Allow 1lb. of apples to 6lb. of blackberries. Cut the apples and boil them with the berries until the apples are tender. Allow equal quantities of sugar and juice if the blackberries are under-ripe, or ¾ measure of sugar to 1 of juice if they are ripe.

Grape Jelly

Crystals sometimes form in grape jelly, so the general method is modified a little. Crush the grapes, add a very little water, and boil them until the skins are tender. Strain the juice and stand it overnight in an earthenware or glass bowl. Pour off the juice carefully so as not to disturb the sediment. Measure the juice and allow ¾ measure of sugar to 1 measure of juice.

Guava Jelly

Guava jelly is often cloudy. To make it clearer, strain it a third time through several thicknesses of clean butter muslin. Use equal quantities of sugar and juice.

Storing Jelly

Store jelly properly labelled with the kind and the date when it was made.

Never store jars with only paraffin wax on the top, but cover them with metal lids or paper covers.

Do not store jelly in a warm, unventilated place. It keeps best in a cool, dry room, for a damp place may start fermentation.

If a little liquid appears on top of the wax or the jelly, this condition is not harmful. It is known as "weeping," and unless a thick mould starts to grow on the liquid the jelly is not spoilt.

Jellies should not be kept much longer than a year, as the colour and flavour usually begin to deteriorate after that.

If jellies must be stored in the kitchen, choose a cupboard as far away from the range or hot-water cupboard as possible.

MAKING BELTS FOR FROCKS

MOST frocks require belts, and the home dressmaker frequently finds difficulty in making one which looks professional and withstands wear and washing satisfactorily. Common faults are belts too long or too short, or so limp that they fold and crease badly.

If the belt is to fasten with a buckle or with two sets of domes or hooks, the length allowed should be the waist measurement plus 4in. If the ends are only to meet, 2in. more than the waist measurement should be allowed when cutting and the belt fitted carefully over the completed garment. Tie belts must also be fitted before they are cut or the bow or knot may be out of proportion.

Width and colour of a belt depend partly on the style of the frock and partly on the figure of the person. Women with well-proportioned figures and small waistlines can wear wide belts in bright, solid, and contrasting colours very effectively. In most cases a belt ¾ to 1½in. wide when finished and of the same material as the frock is the best choice.

Stiffening should be used with most fabrics, though with a very heavy linen sufficient firmness may be obtained by rows of stitching along the belt ¼in. apart if this type of finish matches the style of the frock. Suitable stiffening for heavier fabrics is dressmaker's canvas, book muslin, or an old belt of soft, light suede. For lighter materials organdie or corded ribbon may be used; it should be of a matching colour and washed before use. Stiffening should be cut the shape required for the finished belt, and the material needs to be three times that width plus seam allowances. The stiffening is placed slightly off centre on the belt material, the narrower edge is folded over, then the wider with the seam allowance turned in. It is then tacked down and both edges of the belt are stitched.

—*NORMA K. METSON, Rural Sociologist, Department of Agriculture, Wellington.*

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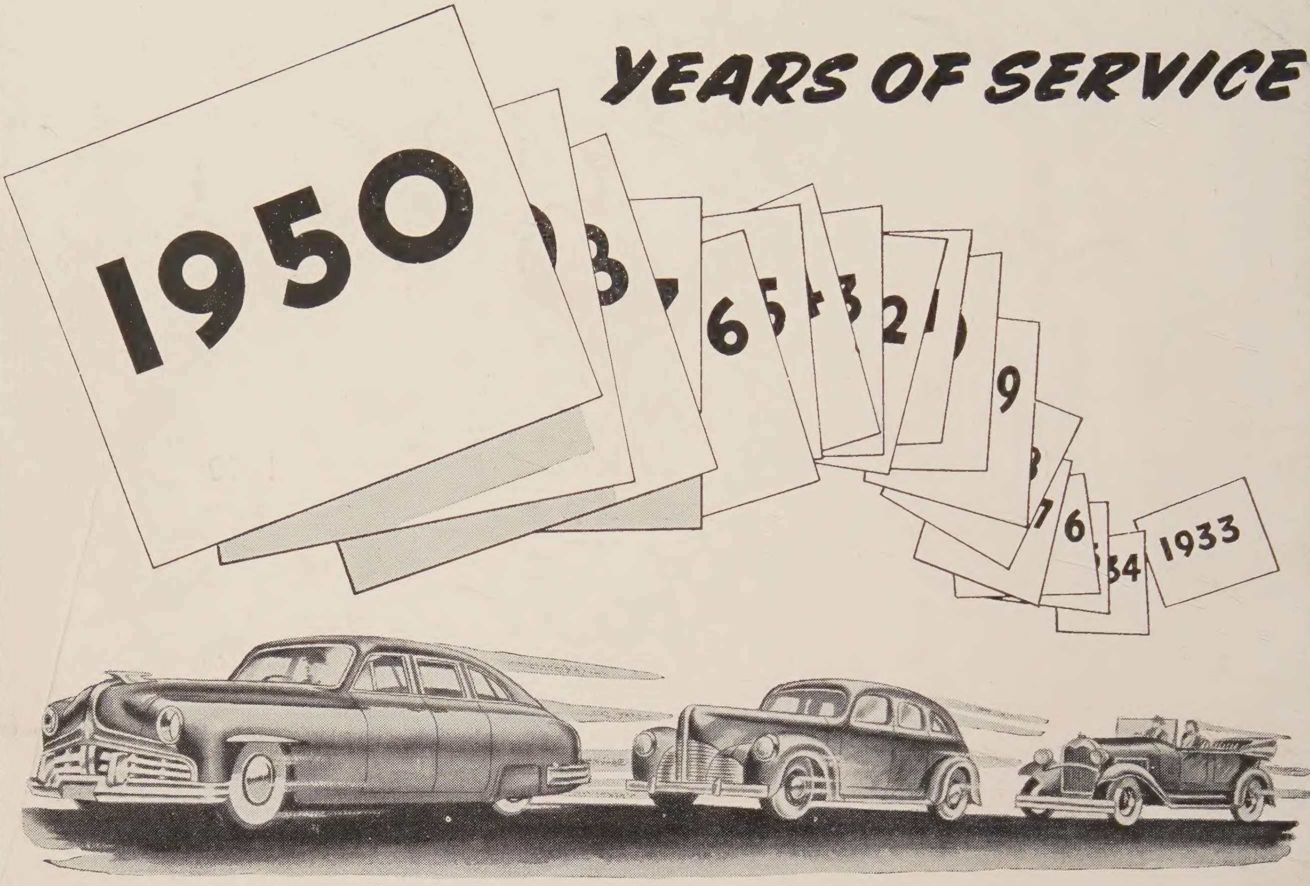
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